Sheeting and unsheeting of non-tipper lorries

A health and safety scoping study

Prepared by System Concepts Ltd
for the Health and Safety Executive

CONTRACT RESEARCH REPORT

305/2000
Sheeting and unsheeting of non-tipper lorries
A health and safety scoping study

Sally Wearing
Tanya Heasman
System Concepts Ltd
2 Savoy Court
Strand, London
WC2R 0EZ

This report contains the results of a study investigating the risks associated with the covering and securing of loads on road haulage vehicles. The HSE has published guidance on how to sheet tipper lorries, however the risks for sheeting and unsheeting other vehicles, including waste carriers, flat beds and curtain-sided vehicles, have not previously been comprehensively studied.

We collected inputs from a wide range of sources, covering both the risks involved and potential solutions. Contributors included haulage and distribution companies, a wide range of manufacturing and other companies, drivers, trade associations, and equipment suppliers.

We confirmed that the sheeting, covering and securing of loads can be high risk tasks, which have the potential to kill and seriously injure people, especially drivers. We discovered that there are solutions available to eliminate or control most of the risks we identified. The problems are either already solvable, or could be with some more development and investigation. We believe that there is a need for more enforcement, and more guidance, which should cover all risks, including road safety and environmental protection. There needs to be close co-operation and co-ordination between the relevant government bodies.

This report and the work it describes were funded by the Health and Safety Executive. Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.
# 1 CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contents</td>
<td>iii</td>
</tr>
<tr>
<td>2</td>
<td>Executive summary</td>
<td>v</td>
</tr>
<tr>
<td>2.1</td>
<td>Introduction</td>
<td>v</td>
</tr>
<tr>
<td>2.2</td>
<td>Recommendations</td>
<td>vi</td>
</tr>
<tr>
<td>2.3</td>
<td>Conclusions</td>
<td>viii</td>
</tr>
<tr>
<td>3</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>The scope of the study</td>
<td>1</td>
</tr>
<tr>
<td>3.2</td>
<td>Legal requirements</td>
<td>1</td>
</tr>
<tr>
<td>3.3</td>
<td>The study objectives</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Study procedures</td>
<td>4</td>
</tr>
<tr>
<td>4.1</td>
<td>Project initiation and planning</td>
<td>4</td>
</tr>
<tr>
<td>4.2</td>
<td>Literature review</td>
<td>4</td>
</tr>
<tr>
<td>4.3</td>
<td>Telephone interviews</td>
<td>4</td>
</tr>
<tr>
<td>4.4</td>
<td>Site visits</td>
<td>5</td>
</tr>
<tr>
<td>4.5</td>
<td>Information analysis and interpretation</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Accident data</td>
<td>6</td>
</tr>
<tr>
<td>5.1</td>
<td>Waste vehicles</td>
<td>6</td>
</tr>
<tr>
<td>5.2</td>
<td>Flat bed vehicles</td>
<td>7</td>
</tr>
<tr>
<td>5.3</td>
<td>Curtain-sided vehicles</td>
<td>8</td>
</tr>
<tr>
<td>5.4</td>
<td>Other vehicles</td>
<td>9</td>
</tr>
<tr>
<td>5.5</td>
<td>Use of control measures</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>Summaries of sector results</td>
<td>10</td>
</tr>
<tr>
<td>6.1</td>
<td>Waste, recycling and scrap metals industries</td>
<td>10</td>
</tr>
<tr>
<td>6.2</td>
<td>Fertiliser manufacturers</td>
<td>12</td>
</tr>
<tr>
<td>6.3</td>
<td>Soft drinks and food</td>
<td>14</td>
</tr>
<tr>
<td>6.4</td>
<td>Paper and board</td>
<td>15</td>
</tr>
<tr>
<td>6.5</td>
<td>Steel</td>
<td>16</td>
</tr>
<tr>
<td>6.6</td>
<td>Hard products – concrete, bricks, blocks, tiles, etc.</td>
<td>17</td>
</tr>
<tr>
<td>6.7</td>
<td>Breweries</td>
<td>18</td>
</tr>
<tr>
<td>6.8</td>
<td>Straw and hay</td>
<td>19</td>
</tr>
<tr>
<td>6.9</td>
<td>General haulage and distribution companies</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>Risk analysis</td>
<td>22</td>
</tr>
<tr>
<td>7.1</td>
<td>Waste containers</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2 EXECUTIVE SUMMARY

2.1 INTRODUCTION

The HSE has published guidance for tipper lorries but the hazards of sheeting and unsheeting other road haulage vehicles are not addressed in this guidance.

A range of vehicles have health and safety risks associated with how loads are covered (whether by sheets, nets or curtains) and secured. These include flat beds, waste vehicles, curtain-siders and tilt trailers. Although it is known that accidents occur during the covering and securing of loads on these vehicles, there is little collated information on what causes the accidents and in which industries they occur.

The scope of the study was purposely broad to cover not only the range of vehicles described above, but also as wide a range of industries as possible, to find out which are affected.

Three different types of criminal law are relevant to the securing and covering of loads: health and safety; road traffic; and environmental protection. They are drafted and enforced by different government bodies.

System Concepts Ltd were commissioned by the HSE to conduct a study of the health and safety issues associated with the sheeting and unsheeting of loads on vehicles other than tipper lorries. The project took the form of a scoping study, to investigate the health and safety risks in a wide range of industry sectors, and to identify any good practice solutions that may reduce these risks. It also included making recommendations concerning the feasibility of publishing advice/guidance on methods of sheeting/unsheeting that are applicable to non-tipper lorries operating in a wide range of industries.

Objectives:

This project was a scoping study designed to:

- Identify risky tasks (and their location) associated with sheeting/unsheeting non-tipper lorries in different industry sectors
- Collect together information describing the type and scale of the problems
- Document any good practice solutions which help to reduce the frequency and/or severity of the health and safety problems in particular industry sectors
- Investigate whether and how the HSE Guidance (HSG 148) should be broadened to include new technology and non-tipper vehicles.

In the full report we present an analysis and discussion of our findings. We obtained and analysed accident data. We interviewed companies and trade associations in nine industrial sectors. We visited a number of sites and carried out risk analyses of the tasks that we saw. During our visits, we also saw a number of solutions, which we assessed to determine whether they complied with good practice and legal requirements. We also reviewed the guidance that is or will shortly be available, and assessed whether further guidance is required.
2.2 RECOMMENDATIONS

Our recommendations cover actions that might be taken by various parties involved in minimizing accidents associated with the covering and securing of loads, including manufacturing companies, haulage and distribution companies, suppliers, trade associations and government bodies. We also outline areas in which we believe further research should be considered. Where our recommendations are numbered, we have listed them in approximate order of priority.

2.2.1 General recommendations

- Improve co-ordination and co-operation between the government bodies involved.
- Improve the training of goods vehicle drivers.
- Combine official guidance, so that employers have one source that covers all related risks.
- Revise the DETR Code of Practice on the safety of loads on vehicles.
- Continue the policy of pressurising manufacturers and site operators.
- Enforce legal requirements where necessary.
- Encourage more co-ordination by trade associations of their members.
- Control contractors by implementing suitable selection, supervision and monitoring procedures.
- Educate and persuade customers and suppliers, whose actions affect the health and safety of drivers and other people.
- Collect case study material to illustrate the application of different controls.
- Evaluate the feasibility of preparing a British or European Standard for load restraint systems on curtain-sided vehicles.

2.2.2 Recommendations for specific risks

1. Establish safe systems of work to control the interaction of the vehicle driver and the fork lift truck driver.
2. Monitor and supervise safe systems of work.
3. Install vehicle restraint systems where reasonably practicable.
4. Use simpler systems (such as large stop signs or key retention systems) to prevent drivers pulling away early.
5. Establish preventative maintenance procedures
6. Evaluate equipment to ensure that it is the most suitable available.

2.2.3 Recommendations for specific vehicles

Flat bed vehicles

1. Follow the general principles of the HSE guidance for tipper lorries.
2. Develop sheeting devices for flat bed vehicles, which will remove the need to climb on top of the load.
3. Investigate the use of sheet support tables on flat bed vehicles.
4. Prepare and publish official guidance in the safe use of flat bed vehicles.
5. Investigate the practicability of sheeting or netting vehicles from the floor using two people.
Curtain-sided vehicles

1. Establish safe systems for checking whether the load has shifted in transit and for dealing with ‘bulging’ loads.
2. Prepare and publish official guidance in the safe use of curtain-sided vehicles.
3. Establish and implement safe systems of work for opening and closing curtains.
4. Ensure that there are safe means of access to the deck of all vehicles.

2.2.4 Recommendations for specific industries

These recommendations are in addition to the ones in the preceding three sections.

Waste and recycling industry

1. Complete and issue the industry guidance prepared by the Environmental Services Association.
2. Fit mechanised sheeting devices to all new vehicles and retro-fit to existing vehicles.
3. Install gantries at transfer stations and landfill sites.
4. Evaluate the use of platforms on transfer stations and landfill sites.
5. Improve the packing of bulkers and containers at transfer stations and civil amenity sites.
6. Evaluate and increase the use of vehicles and containers that do not need sheeting.
7. Develop sheeting devices further.
8. Re-design access ladders on containers.

Fertiliser manufacturers

1. Stop all double stacking of fertiliser bags.
2. Stop partial sheeting of the load.
3. Install gantries at all sites where bags of fertiliser are loaded onto flat bed vehicles.
4. Improve the guidance drafted by the Fertiliser Manufacturers Association.
5. Use lightweight sheets instead of heavier tarpaulins.
6. Evaluate the use of platforms to analyse how much they reduce risks.
7. Fit mechanised sheeting devices as soon as they become available.
8. Investigate the design of the fertiliser bags to find an alternative that does not retain water.

Brick, concrete and other hard products

1. Eliminate the need to sheet on loads that do not require protection from the weather.
2. Stop partial sheeting of the load.
3. Install gantries where flat beds without cranes are loaded.
4. Evaluate the use of gantries with vehicles mounted with cranes.
5. Evaluate the use of platforms for both vehicles with and without cranes.
6. Use nets or lightweight sheets instead of heavier tarpaulins.

Steel

1. Review the safe operating procedure that the Freight Transport Association is preparing.
2. Evaluate whether gantries should be installed where steel is sheeted on flat bed vehicles.
3. Evaluate the use of platforms.
4. Install gantries or platforms.
5. Investigate the use of tilt trailers and other similar vehicles.
**Paper and board**

1. Evaluate the use of additional or alternative restraint systems.
2. Follow up any unsatisfactory loads with the company who sent it.

**Breweries**

1. Evaluate the use of additional or alternative restraint systems.
2. Evaluate alternative vehicles, such as the FBD.
3. Work with equipment suppliers.

**Other industries, including general haulage and distribution**

We recommend that all other industries, including general haulage and distribution companies, should implement those of the above recommendations that are relevant to them.

### 2.3 CONCLUSIONS

The covering and securing of loads on the haulage vehicles included in this study can be high risk tasks, which have the potential to kill and seriously injure people, especially drivers.

Where companies have worked together under the co-ordination of a trade association, some sectors, for example the waste industry, have made progress and solutions have been found and shared. However, we did find that in one sector where the trade association has been involved, the results were not adequate.

We discovered that there are solutions available to eliminate or control most of the risks we identified. The problems are either already solvable, or could be with some more development and investigation.

Overall, we do not consider that safe systems of work are sufficient by themselves to adequately reduce the risks of covering and securing loads, especially for the highest risks, which include: working at heights on hazardous surfaces; dealing with loads that have shifted in transit; and drivers working in the same area as fork lift trucks that are loading or unloading.

Some of the solutions found in this study did need further development. These need to be evaluated by equipment suppliers in conjunction with the companies who would use them, and they could be the subject of future projects.

We believe that there is a need for more enforcement and more guidance. Some companies were not complying with the existing guidance and we believe that the lack of specific guidance may encourage this. Guidance should be either published by the HSE or by industry, as long as it is endorsed by the HSE.

At present, anyone operating haulage vehicles has to comply with a wide range of legal requirements, some of which conflict. There needs to be close co-operation and co-ordination between the relevant government bodies to allow different risks to be balanced and minimised. This should include the preparation of official guidance that covers all risks, including road safety, occupational health and safety and environmental protection.
3 INTRODUCTION

In this chapter, we provide an overview of the scope of the study, the relevant legislation and the study objectives.

3.1 THE SCOPE OF THE STUDY

The HSE has published guidance for tipper lorries but the hazards of sheeting and unsheeting other road haulage vehicles are not addressed in this guidance. Quarry companies contacted in 1998 (as part of project contract no. 3826/R53.170 ‘Quarry vehicle access and egress – an ergonomics study’) were reporting accidents with manual sheeting/unsheeting of flat bed vehicles. However, loads are not only secured and covered on flat beds. These operations are carried out on a range of vehicles including:

- flat beds
- rollonoff waste vehicles
- bulk waste carriers
- curtain-sided trailers (also often called taut liners)
- tilt trailers.

All of the above vehicles have health and safety risks associated with how loads are covered, whether by sheets, nets or curtains, and secured. The increase in the use of curtain-sided vehicles has reduced the number of flat bed wagons, however, there are still potential hazards associated with the use of curtain-siders. Although it is known that accidents occur during the covering and securing of loads on these vehicles, there is little available information on what causes the accidents and in which industries they occur.

The problems affect a wide range of industries. Some of the vehicles are specific to one or two industry sectors, such as rollonoff and bulk waste vehicles, however, both flat beds and curtain-siders are used to carry many different loads.

The reasons for covering the load also vary. On curtain-siders, the curtains keep the load clean and dry, and help secure the load, preventing the load being shed during transit. They also keep the load hidden, which can be important for loads that are liable to be stolen, and are often used to advertise the company name. On flat beds, sheets are used to keep the loads dry and clean, as well as to secure them during transit. On bulkers, rollonoff and other waste vehicles, loads usually need to be covered to comply with environmental legislation.

The scope of the study was purposely broad to cover not only the range of vehicles described above, but also as wide a range of industries as possible.

3.2 LEGAL REQUIREMENTS

Three different types of criminal law are relevant to the securing and covering of loads: health and safety; road traffic; and environmental protection. They are drafted and enforced by different government bodies.
The main pieces of relevant health and safety legislation are:

- The Health and Safety at Work Etc. Act 1974, which requires employers to ensure the health and safety of employees and of others which may be affected by their undertaking, and requires employees to take reasonable care for their own safety and that of others;
- The Management of Health and Safety at Work Regulations 1999, which require employers to carry out an assessment of all significant risks, to co-operate and co-ordinate preventative measures with other employers, to provide information and training to employees and to provide information to the employees of others who are working on their premises, and requires employees to use equipment as they were trained to;
- The Workplace (Health, Safety and Welfare) Regulations 1992, which require employers to take measures to prevent falls or falling objects which are likely to cause personal injury;
- The Provision and Use of Work Equipment Regulations 1998, which require employers to ensure that equipment is suitable and that risks are adequately controlled, and to provide training and information to employees.

Extensive legislation covers the transport of goods by road, and road safety in general. The most important requirements relevant to this study are:

- it is an offence to use a vehicle, or cause or permit it to be used, when the position or distribution of its load or the manner in which it is secured means there is a danger of injury to any person;
- loads should at all times be secured and be in such a position that neither danger or nuisance is likely to be caused to any person or property by reason of the load falling, or being blown from the vehicle, or by reason of any other movement of the load;
- it is an offence to use a vehicle or cause or permit it to be used when overloaded;
- the maximum permissible weights and dimensions of goods vehicles must not be exceeded. (for instance, the maximum permissible width is 2.55 metres).

The Environmental Protection Act 1990 requires carriers to ensure that all waste is securely loaded and contained during transit.

### 3.3 THE STUDY OBJECTIVES

System Concepts Ltd were commissioned by the HSE to conduct a study of the health and safety issues associated with the sheeting and unsheeting of loads on vehicles other than tipper lorries. The project took the form of a scoping study, to investigate the health and safety risks in a wide range of industry sectors, and to identify any good practice solutions that may reduce these risks. It also included making recommendations concerning the feasibility of publishing advice/guidance on methods of sheeting/unsheeting that are applicable to non-tipper lorries operating in a wide range of industries.

**Objectives:**

This project was a scoping study designed to:

- Identify risky tasks (and their location) associated with sheeting/unsheeting non-tipper lorries in different industry sectors
• Collect together information describing the type and scale of the problems

• Document any good practice solutions which help to reduce the frequency and/or severity of the health and safety problems in particular industry sectors

• Investigate whether and how the HSE Guidance (HSG 148) should be broadened to include new technology and non-tipper vehicles.

In this report we present an analysis and discussion of our findings. Chapter 4 describes the procedures we followed in this study. Chapter 5 presents the results of our examination of accident data from the HSE and other sources. Chapter 6 contains short summaries on each of the industry sectors investigated. Chapter 7 describes our findings of the risks involved in the sheeting and unsheeting of vehicles, presented by type of vehicle. Chapter 8 presents details of the solutions discovered in the study. Chapter 9 describes the findings from the investigation into what guidance is required.

Chapter 10 draws together our recommendations and presents detailed findings before final concluding comments and suggestions for future research are given in Chapter 11. References are included in Chapter 12.
4 STUDY PROCEDURES

In this chapter, we describe the procedures and techniques followed during the course of this study.

4.1 PROJECT INITIATION AND PLANNING

The project started with a meeting with the HSE to agree in detail the requirements for this assignment. This confirmed our general approach to the project, which was to cover as wide a range of industries and vehicles as possible.

4.2 LITERATURE REVIEW

In the first instance we carried out a literature review to identify past research findings, known risk factors and suggested design solutions. Unfortunately, we were unable to find any research that had previously been carried out into this subject. However, we did identify the relevant legislation, including that relating to health and safety, environmental issues and load security during transit.

We also identified the relevant Health and Safety Executive (HSE) guidance, Department of the Environment, Transport and the Regions (DETR) guidance, and guidance from various trade associations, some of which was in draft form. The guidance demonstrated the present level of information available. Details of what guidance is available, and how adequate it is, are included in Chapter 9.

All the literature identified is referenced in Chapter 12.

4.3 TELEPHONE INTERVIEWS

First we drafted the structure and scope of the telephone interviews for both companies and organisations. The questionnaires used varied slightly depending on whether the interview was with a manufacturing or waste company, a distribution or haulage company, a trade association or an equipment supplier, but they all covered the main aspects of the study, concentrating on health and safety risks and solutions.

We then contacted a wide range of trade associations, companies, and vehicle manufacturers. We carried out telephone interviews with appropriate representatives. Typically our contacts were safety or health and safety officers/managers. Interviews with manufacturing and waste companies and haulage or distribution companies sought the following information:

- Identification of types of non-tipper lorries requiring sheeting/unsheeting
- Details of the circumstances where accidents and injuries are most likely to occur.
- Initial prioritisation of risky tasks
- Details of any existing or potential solutions
- Views of the drivers on the acceptability of different solutions
- Applicability of the HSE guidance and the need for further guidance
- Commitment to further involvement.
The manufacturers of the vehicles and of the mechanisms that provide mechanised and automated sheeting facilities were asked about any health and safety aspects associated with their equipment, the specification of their equipment, what equipment they supplied and its uses, and whether they were developing any relevant equipment.

We also contacted other bodies who might have information relevant to this study, for example HSE industry sectors, the DETR and the Driving Standards Agency (DSA).

4.4 SITE VISITS
We identified a small sample of sites to visit to observe the risky tasks and/or to examine existing or potential solutions. The purpose of the site visits was primarily to observe the range of vehicles used, how they are sheeted and unsheeted, and any solutions that have been or are being developed.

Our visits were organised so that we could observe, photograph and videotape sheeting tasks. When possible, we also interviewed vehicle operators and drivers, and site managers to obtain a fuller picture of the problems under investigation and how acceptable the solutions were. The photographs and video footage taken formed the basis of generic task analyses. The site visits also enabled us to see some of the environments in which sheeting and unsheeting took place.

4.5 INFORMATION ANALYSIS AND INTERPRETATION
The data collected during the site visits allowed us to apply suitable analysis techniques to form an assessment of the high-risk tasks. The outcome of the analysis allowed us to prioritise the tasks more objectively, rather than just relying on the mostly subjective data obtained during the interviews.

We analysed the solutions to determine whether they adequately addressed the risks identified. Solutions were compared with the relevant legislation and existing HSE guidance to determine whether they were legally compliant and represented good practice. Where possible, we also took into account the legislation concerning the security of loads on the roads and environmental legislation.

We also assessed solutions that applied to one type of vehicle or were found in a particular industry to determine whether they had wider applications. Some of the engineering solutions were also categorised according to whether they can be implemented by vehicle manufacturers or can be retro-fitted by the vehicles owner/operators.

Where possible, we compared guidance from trade associations and companies with the existing HSE guidance and legal requirements. We analysed requirements for broadening or modifying the existing guidance.

We then collated our findings (see Chapters 5, 6, 7, 8 and 9) and formulated a number of recommendations (see Chapters 10 and 11).
5 ACCIDENT DATA

We sought to obtain accident data relating to sheeting and unsheeting from the HSE, and during the interviews conducted with organisations and companies.

We found that there were no sources that had statistics that could give provide quantitative data. None of the organisations contacted were able to supply data. Information was obtained from many of the companies that were interviewed. However, apart from one fertiliser manufacturer, all of the data obtained was anecdotal.

We worked with the HSE unit that collates the data received under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995. Data was available from May 1996 to early 2000. Extracts from the accident table of the HSE database did not contain enough information for us to decide whether the accidents were related to sheeting, or which vehicles or industries were involved. For instance, the category FVSHEETING (defined as falls ‘from load on vehicle or when sheeting’) covers all goods vehicles, including tipper lorries.

It was therefore decided to examine just data from accidents which had been investigated by the HSE, for which further information could be obtained from the database. This limited the number which could be examined (for instance, investigation information was only available for 40 out of 432 accidents categorised as FVSHEETING) but provided more detailed information. This also meant that the accidents included in this report will have the most serious outcomes, as these are the ones that are most likely to be investigated. The investigation information provided by the HSE showed that FVSHEETING not only included sheeting accidents, but also ones involving loading and unloading, etc.

In order to gain some meaningful information from both the HSE data and the interview data in this study, we decided to combine these and present it qualitatively. This could then be used to show what types of accidents are happening in which industries, to give an indication of whether the perceptions reported in the industry summaries in Chapter 6 are realistic. The accident data was also taken into account when carrying out the risk analyses presented in Chapter 7.

We have presented the accident information by vehicle type, with details of the industries involved where available. As with any accident data, it is probable that there is substantial under-reporting, especially of the less serious injuries. For instance, one of the waste companies contacted in this study stated that they had had no reportable accidents in the last five years. However, one of their drivers had suffered a reportable accident that was investigated by the HSE in 1998.

5.1 WASTE VEHICLES

Information on 18 serious accidents was obtained. Details of eight accidents in the waste and recycling industries were included in the data obtained from the HSE. Another ten accidents were described by the eight waste and recycling companies contacted in this study.

All of the accidents were falls, all involving drivers on the tops of large waste vehicles, mostly involving bulk waste vehicles or waste containers carried on rollonoff vehicles.
In all except one of the accidents, the drivers fell off the top of the waste container to the ground. 15 of the accidents occurred when drivers were sheeting or unsheeting.

Two further accidents occurred on containers that were to be loaded onto rollonoff vehicles fitted with mechanical sheeting devices, which meant that the drivers did not need to go on top of the load to sheet. However, both containers had been overfilled by the customer, preventing the mechanical sheeting devices from operating. The drivers had to go on top to rearrange the waste (doors and car bumpers) and both fell off while doing this.

In the last accident, the driver was on top of the container while it was being loaded with waste paper by a mobile grab crane. He had accessed the load top to level the load and to assist in ‘topping up’. He either lost his balance or was knocked over by the grab.

At least 11 of the accidents resulted in fractures, including four spinal injuries. One of these resulted in the driver being paralysed from the waist down.

5.2 FLAT BED VEHICLES

Information on 30 serious accidents was obtained. Details of 16 accidents involving flat bed vehicles were identified from the data obtained from the HSE. Another 14 accidents were described by manufacturing and haulage companies contacted in this study.

Falls accounted for 25 of the accidents, all involving drivers on the beds or the loads of the vehicles. Apart from one accident, where the driver was walking on the bed of the vehicle, all of them occurred when the driver was covering or securing the load.

One fall caused a fatality, and most of the rest resulted in serious injuries, including at least 12 fractures.

The other five accidents all involved the driver being struck by moving objects. Four of these were where the driver was unsecuring the load while standing on the ground, when the load shifted and fell on him. Two of these accidents were fatal. The other accident happened when the driver was on the bed of his vehicle, unnecessarily, during loading and he was knocked off by the load.

The 25 falls were associated with the following loads: 7 fertiliser, 5 brick, 3 steel, 2 concrete, 2 timber, 1 gutters, 1 bags of powder for furnaces and 3 not recorded. The five other accidents were: 2 bales on farms, 1 metal extrusions, 1 scaffolding and one unknown.

Five of the falls were or may have been due to the poor condition equipment, such as ropes, straps or the deck of the vehicle. Two falls were due to the wind.

Other, more anecdotal, evidence from the interviews suggests that the reported accidents are the tip of the iceberg and that there are many other accidents occurring. One steel manufacturer stated that falls off the back of vehicles happened about once a month. A driver in a small haulage firm carrying fertiliser said that he had been blown off ten times by wind when sheeting, but had never been injured.
5.3 CURTAIN-SIDED VEHICLES

Information on 16 serious accidents was obtained. Details of seven accidents involving curtain-sided vehicles were identified from the HSE data. Another nine accidents were described by manufacturing and haulage companies contacted in this study.

Only one of the accidents was a fall. A beer delivery driver fell from the back of a vehicle when sorting his load during delivery. He had become entangled in the shrink wrapping of one of the pallets and he fell to the ground. All of the other six accidents investigated by the HSE involved someone being struck by a moving object. In five of these, the object was the load, while in the other one, the driver was struck by a fork lift truck.

The nine accidents described by companies also involved someone being struck by a moving object. Three were struck by the load, three by part of the vehicle, one was run over by a fork lift truck and two were in a fork lift truck that overturned.

Two of the 16 accidents resulted in fatalities, both where someone was hit by a falling load. At least seven resulted in broken bones.

By examining all the accidents together (except for the fall), a number of basic problems can be identified. In five accidents, the load shifted during transit and fell out of the vehicle when the curtain was opened, hitting the vehicle driver who was opening the curtain. Three of these involved paper bales or reels and the other two beer kegs. In the three accidents where the driver was struck by part of the vehicle, these were: the curtain which had been caught by the wind; a ratchet used to tighten the curtain; and one of the centre supporting poles.

In seven accidents, the accident was at least partly due to the interaction between the fork lift truck involved in loading or unloading the vehicle and someone else in the vicinity, mostly the driver of the vehicle. Three of these resulted in the fork lift truck overturning because the driver moved the vehicle while the fork lift truck was still loading or unloading the vehicle. In another three accidents, part of the load shifted and hit the injured person. Two of these were drivers, and at the time of the accident one of them was opening the curtain, while the other one was assisting loading. The third accident killed a motorcyclist who was passing the vehicle being unloaded, which was parked on a road outside the site that the load was being delivered to. In the last of the seven accidents, the fork lift truck driver ran over the driver after they had exchanged paperwork.

We examined a further five accidents that the HSE investigated, but where the type of goods vehicle involved was not detailed. In all of these, poor interaction between the fork lift truck and the vehicle driver had helped cause the accident. Two were due to the driver pulling away before the fork lift truck driver was clear of the vehicle, two were due to part of the load shifting and the last one involved the driver being run over by the fork lift truck.

Combining all 21 accidents, they occurred in the following industries: 4 brewing, 4 paper and board, 3 food and soft drinks, 3 in general distribution, 1 concrete, 1 moving fixtures and fittings and 5 were not recorded.

Other, more anecdotal, evidence from the interviews again indicated that there are many other accidents occurring. The following comments were made during interviews:

• “we’ve had a few near misses due to the load shifting and falling out”
• “couple of hand injuries due to problems with the central poles”
• “poles flicking out unexpectedly have hit fork lift truck drivers”
• “we’ve had problems with curtains flapping in faces and fork lift truck drivers loading while drivers have pulled away”
• “no accidents but there have been near misses”.

5.4 OTHER VEHICLES
The only other vehicles identifiable from the HSE data were tilt trailers. These were involved in three accidents:

• a driver was pulling the cover over when a strap broke and he fell off the trailer, fracturing his skull
• a driver was on the bed of the lorry while it was being unloaded by a fork lift truck, when part of the load of cement bags shifted and fell on him, causing bruising and lacerations
• during unloading, a gust of wind caught the curtain and frame of the vehicle, causing a roof bar to fall out and knock the driver of the vehicle unconscious.

5.5 USE OF CONTROL MEASURES
In most of the accidents described above, there were few control measures in place. Where there were safe systems of work, they were often not being followed.

However, even when control measures are provided, they did not always prevent problems. In section 5.1, two accidents were described that happened where waste vehicles had been fitted with mechanical sheeting devices, but overloading by customers meant that the drivers climbed on top of the loads to rearrange them so that they could use the sheeting devices.

Included in the HSE data were details of eight accidents that occurred on tipper lorries that were relevant to this study. Easy-sheeting devices were fitted to five of the tippers involved. Three of these stuck, one because the vehicle had been overloaded to achieve a full payload. All three drivers climbed onto the load to free the devices and fell off. One slipped on the load, one fell when the device suddenly moved and one when the rope he was pulling broke. In the fourth accident, the driver climbed onto the load to level it, although it should have been levelled by the loading shovel. In the fifth, the driver fell when climbing down the rear ladder of the tipper although he should have sheeted the vehicle from the low level catwalk at the cab end.

In two accidents, sheeting platforms were available but the drivers did not use them and fell while sheeting from on top of the vehicle. In one case, it was felt the inconvenience of using the platform, plus a lack of supervision and instruction, contributed to the accident.

In the last accident, the driver fell a short distance from the steps of a sheeting platform after sheeting his vehicle.
6 SUMMARIES OF SECTOR RESULTS

This chapter gives a brief summary for each of the various industry sectors contacted. Each summary describes the loads and vehicles used in the sector, whether contract hauliers are used and what the people interviewed believe the health and safety problems are. Where appropriate, we have also included information on any involvement by the relevant trade association. The risks referred to in this chapter are explained in more detail in Chapter 6, which brings together the findings by vehicle type, as similar problems are encountered with the same vehicles in different industries.

6.1 WASTE, RECYCLING AND SCRAP METALS INDUSTRIES

These industries appear to have the highest risks of all the sectors examined in this study. This is mainly due to the vehicles and loads involved. They also have to comply with the requirement in environmental legislation to securely contain loads.

Many different vehicles and waste containers are used in the waste, recycling and scrap industries. In this study, we concentrated on the ones that are most commonly used and present the biggest risks:

- bulk waste carriers (‘bulkers’, with a capacity of 90 to 110 cubic yards and which are loaded from the top), and
- rollonoff vehicles (which pick up and transport a range of containers from 15 to 50 cubic yards, although 30 to 40 is most common).

Other vehicles are used. For instance, waste paper bales are usually transported by curtain-siders or sometimes on flat beds. We have included these in the section on the paper and board industry, 6.4, as the problems associated with transporting bales have more in common with the rest of the paper industry than with the transport of loose paper or waste.

In addition, some waste such as containers of hazardous substances are transported on pallets in curtain-siders. These present similar problems as transporting goods on pallets in other industries, with the additional hazards of spillage or contamination.

Some waste is transported in small skips which are lifted on to the back of skip loaders. It is possible to easily sheet or net small skips from the ground before they are picked up, however, they are sometimes not covered until they are on the loader. It appears that is due to the choice of some of the drivers who operate these vehicles, but it is not clear why this happens.

A large amount of waste is transported in vehicles, such as rear-end loaders, or containers, such as compactors, that contain the load without sheeting or netting. We have not included these in the study except in Chapter 8 on solutions. The use of these vehicles and containers appears to be increasing, which should reduce the need to sheet or net waste in the future. However, there is a huge number of open containers in use in the industry at present and they will continue to be used for many years.

Some waste is accumulated at transfer stations and then loaded into bulkers to be transported to landfill sites. Loading is carried out by a variety of methods. Some transfer sites have facilities which allow the bulker to be parked below the level where the waste is stored, so that the waste can then be pushed into the vehicle from above. This allows the load to be well compressed, making sheeting easier. On other sites, where these facilities are not available (sometimes due to a shortage of space), bulkers have to loaded by large mechanical shovels. These are used to
try to compress the load into the container, both to achieve a full payload and a more stable surface for sheeting. This compaction can cause the bulker to bulge at the sides. It can also result in the bulker being violently shaken from side to side, which can damage sheeting devices, if the loading is not carried out correctly.

After loading, the driver usually has to trim the load, to make sure that any waste that is hanging over the edge of the container is removed to prevent it being lost during transit. The driver then sheets or nets the load. At the landfill site, the bulkers have to be unsheeted. These tasks are described in more detail in Chapter 7.

At landfill sites, the tipping area moves as the landfill site is used. This means that the unsheeting location has to move occasionally. In addition, the unsheeting needs to be close to the tipping area to reduce windblown litter.

Other waste is loaded by the producer into containers at the producer’s site for collection on a rollonoff vehicle. Open containers are filled from the top and are frequently overloaded, so that the load extends above the top of the container and/or overhangs the sides, or is badly loaded, resulting in uneven distribution or poor compression of the load. These have to be sheeted or netted before loading. This happens at a vast number of locations.

The collection of materials for recycling is similar, with collections being made from factories, supermarkets, recycling collection points, civil amenities sites (which are often located at transfer stations), etc. Open containers are sheeted or netted before collection, and unsheeted where the material is going to be further processed or handled.

Some waste disposal companies operate and run their own vehicles and containers. Others contract this to haulage companies. Many different companies and individuals deliver waste to landfill sites, using a very wide range of vehicles, over which the operators of the landfill site may have little control.

A wide range of loads have to be covered before being transported. This is necessary to comply with both environmental legislation and the need to secure loads in transit. The loads include:

- general household, commercial or industrial waste
- more specific wastes, which are industry specific, for instance car bumpers, double glazing, formica, etc.
- ‘green’ waste (plants, soil, etc.)
- paper and cardboard
- builders’ rubble
- scrap metal.

These are only a few examples, as the waste and recycling industry may transport all types of waste materials except those with specific hazards (such as asbestos, radioactive waste, etc.) in open containers.
The main health and safety problems associated with the sheeting and unsheeting of waste identified by the companies contacted in this study were:

- walking on top of loads in the larger containers in order to trim, sheet and unsheet the load, where the nature of the waste (badly packed loads that can shift, voids, sharp materials, slippery surfaces, etc.) often causes drivers to fall into the load or to fall off the container
- climbing up or getting down from bulkers and containers, which can result in falls, often due to the design of the ladders included in containers
- overfilling containers, including the use of ‘greedy boards’ which the waste producers put in to extend the capacity of containers. This can result in difficulty in walking over the load during sheeting and/or drivers having to remove waste from containers before they are able to sheet them
- poorly loaded containers or bulkers, resulting in badly packed or distributed loads
- dangerous materials in the loads, such as broken glass or sharp metal objects, which can result in injuries to drivers when they are walking on them
- wind catching the sheet, especially during sheeting outside
- rain or ice making the load and access to containers more slippery
- many different locations for sheeting
- the need to change the unsheeting location on landfill sites
- keeping the drivers of bulkers out of the way during loading with mechanical shovels.

Most waste companies consider walking on top of the load to be the highest risk, both because of the unstable, dangerous surface of the waste and the height above ground (approximately 2 to 4 metres). One company said that they considered some loads, such as double glazing waste, to be so dangerous that they do not sheet it, although they consider that there is a legal requirement to do so. The next highest risk is considered to be climbing on and off bulkers and containers.

Recently, there has been considerable effort within the waste and recycling industries to address these problems. A sub-committee of the health and safety committee of the Environmental Services Association is actively working towards issuing guidance to waste companies. This guidance is assessed in Chapter 9. Possible solutions to sheeting and unsheeting problems are described and assessed in Chapter 8.

### 6.2 FERTILISER MANUFACTURERS

The problems associated with sheeting and unsheeting in this industry appear to be second only to the waste industry. There have been many serious accidents, as described in Chapter 5.

The majority of vehicles used to transport bagged fertilisers are flat beds and curtain-siders. A few other vehicles types are used, for instance by individuals who collect directly from manufacturers. However, the main risks lie with the most commonly used vehicles, especially flat beds.

Transport of bags by road is between docks or manufacturers and the users, on farms. It is alleged that it is not possible to use only curtain-siders, apparently because farms have limited access which does not permit the use of tall vehicles. Most fertiliser is transported by haulage companies.

The trade is highly seasonal. In the busy periods, where there is high demand, many hauliers are involved in transporting fertiliser. This means that there are many different employers
involved in this trade, some of them for only brief periods of the year. In the season, some manufacturers may be loading up to 60 vehicles per hour, half of which could be flat beds.

The majority of fertiliser is sold in 500kg bags, in intermediate bulk containers (IBCs). These bags have two layers, an outer woven one that provides the strength and includes loops that allow the bags to be picked from above by a fork lift truck, and an inner bag that seals the fertiliser in and keeps it dry. The main reasons for using the IBCs are that they are widely used and therefore cheap, and they are disposed of after being used once.

The loads on flat beds are covered with sheets (mostly conventional tarpaulins) and roped. This is partly done to secure the load, but sheeting is mainly done to keep the bags dry and clean.

Although the bags are waterproof, if they get wet, water gets between the two layers of the bag. When the fertiliser is used, the bags are put into spreaders, turned upside down and the tops are cut off. This releases the water as well as the fertiliser into the spreader which can then become clogged. In addition, water ingress into the packaging can increase the weight of a load. The only reason for keeping the bags clean appears to be the preference of the farmers.

Fertiliser bags could be secured by only roping, although this would need more ropes than are used over the sheets at present, and some manufacturers voiced concern that ropes used without sheets might damage the bags.

The companies contacted in this study identified the following health and safety problems associated with the sheeting and unsheeting of loads of fertiliser on flat bed vehicles:

- wind catching the sheet, especially during sheeting outside
- walking on top of the load (approximately 2.3m above floor level), where voids in between the bags, pockets of air in the tops of the bags (if they have been recently filled), the bag loops, etc., can all cause drivers to trip or slip and fall off the lorry
- climbing on and off the lorry, as there is no means of access provided
- a wide variety of locations for unsheeting
- poor condition of the ropes, sheets and straps, which may fail during use
- being struck by the fork lift truck during loading, especially if the load is sheeted during loading (some drivers sheet each truck load of bags before the next is loaded, as this can be done from the bed of the lorry)
- manual handling of the sheet (which can weigh 40 to 50 kg).

As well as walking on top of the load while sheeting or unsheeting, drivers may have to climb onto the load to pull up the loops on the tops of the bags so that they can be picked up by fork lift trucks.

In order to get a full payload on some vehicles, one of the manufacturers interviewed double stacks the last few bags, on top of the full layer of bags. Figure 45 in section 8.2.2 shows a flat bed vehicle loaded with a double stack of bags. It is therefore impossible to walk down the middle of the load when unrolling a sheet, so the driver has to walk along the side of the load, around the top stack. This increases the risks during sheeting, as described in Chapter 7.

Most of the companies (manufacturers and hauliers) contacted in this study would not double stack fertiliser bags as they felt that that risks were too high. Two of the haulage companies felt that if the bags were stacked properly by a good fork lift truck driver, then there was no need to double stack (as a full load could be achieved in a single layer). Better loading also reduces the risks of walking on the load, as there should be fewer voids between bags.
Two of the manufacturers would like to increase the weight of the bags to 600 kg, so that a full payload could always be carried in a single stack. However, this would increase the height of the single stack. Other manufacturers believed that fertiliser blenders and farmers did not want this change. Larger bags might not be usable in spreading equipment, and may present problems when unloading at farms. One company said that although it would improve the payload, there were too many other problems.

Not all drivers climb on to the load to unsheet. Some drivers always do. However, some said that they only did if they had to unsheet where the sheet would get dirty if it fell on the floor, which was quite common as most deliveries are made to farms. One driver interviewed stated that he always unsheeted by undoing the ropes and then pulling the sheet from the ground, and never went on top.

Overall, few of the companies contacted recognised any health and safety problems associated with the use of curtain-sided vehicles for the transport of fertiliser bags. This appeared to be because they perceived the risks associated with the use of flat beds to be so high that the risks from curtain-siders were insignificant. However, a few did identify problems associated with the interaction between the fork lift truck driver and the driver of the vehicle.

When using curtain-sided vehicles, the load may be restrained by tying the top loops of the bags together and strapping them to the top of the vehicle. This would involve the driver climbing onto the top of the load. However, this is not always done, but it is not clear why.

There was a wide range of views of the fertiliser manufacturers’ responsibilities to the drivers who deliver for them. One of the manufacturers acknowledged the HSE view that the bed of the lorry was a ‘shared workplace’ and that they therefore had a responsibility to help ensure the safety of the drivers. However, another manufacturer felt that it was ‘not their problem’.

A few of the manufacturers have developed control measures to try to combat the problems that they perceive. These are described in Chapter 8.

6.3 SOFT DRINKS AND FOOD

The majority of road transport used by food and soft drinks manufacturers is by curtain-sided vehicles. These range in size from large articulated trailers to small delivery vehicles. There are often two distribution stages: primary from the manufacturer to a distribution centre, for which the bigger vehicles are used; and secondary from the distribution centre to pubs, clubs, shops, etc., for which smaller vehicles are often used.

Most of the loads are palletised and shrink wrapped, and are loaded by fork lift trucks. There are some exceptions to this, for instance when orders are picked for delivery to end users or when bottles are carried in crates.

Some companies own and operate their own fleet of vehicles. However, it appears that many companies use contract haulage companies.

The main health and safety problems identified by the companies contacted in this study were:

- interaction between the driver of the vehicle and the fork lift truck driver during loading, unloading, operation of the curtains, etc.
- wind catching the curtain while they are being opened or when open
The companies interviewed for this study recognised the need to control these problems and they have put in place a range of control measures. Details are included in Chapter 8.

One of the companies contacted in this study is coming under pressure from supermarkets to deliver goods stacked on wheeled dollies or in roll cages. This then allows the supermarket to reduce their manual handling, as the goods can be more easily moved to the point of sale. However, this presents more problems during delivery as loads would have a higher centre of gravity and would be harder to restrain during transit. This change is at present under discussion.

6.4 PAPER AND BOARD

The paper and board industry transports both raw materials for making paper and finished products. The raw materials used include waste paper and board. The collection and transportation of loose paper and board was included in the summary of the waste industry in section 6.1, as the same vehicles and methods are used. This section covers the rest of the paper and board industry.

The majority of road transport used is by curtain-sided vehicles. Only one of the paper companies interviewed used a few flat bed vehicles.

The loads include reels of paper, bales of virgin pulp (which are stable and consistent), bales of waste paper (which are inconsistent and may be unstable) and finished products on pallets.

Most of the companies interviewed use contractors, although one company did have its own vehicles as well and also used some agency and self-employed drivers.

The main health and safety problems identified by the companies contacted in this study were:

- unsecured or poorly secured (e.g. poor or insufficiently strapped) loads that move in transit to lean against the curtain, which can then fall out when the curtains are opened
- poor loading causing the load to shift in transit and fall out when the curtain is opened
- poor baling of waste paper creating unstable bales which collapse or crumble in transit, and which can again fall out when the curtains are opened
- trucks pulling away while still being loaded or unloaded
- getting on and off curtain-sided vehicles
- wind catching the curtain
- jamming curtains
- upright centre poles coming out suddenly when being moved.

All of the companies contacted said that the highest risk was of the load shifting during transit, due to any of the first three problems listed above. Even properly secured loads can shift in transit. One company said that it is not always possible before opening the curtain to tell
whether the load has shifted. A bulge in the curtain may be due to the load having moved or it may be because the bales are large and were pressing against the curtains when they were loaded.

These problems are closely linked with load security while being transported on the roads. Approximately one vehicle a month sheds its load. Reels of paper are very heavy and this has caused fatalities.

Research has been carried out into the restraint of loads by the Motor Industry Research Association. The Paper and Board Industry Advisory Commission has set up a working party to examine the transporting of paper bales and reels. All of the paper manufacturers interviewed for this study are working to reduce the risks and they have put in place a range of control measures. Details are included in Chapter 8.

6.5 STEEL

Steel is often transported by rail, however some is transported by road, on flat bed vehicles and specialist vehicles known as tilt trailers. These are trailers that have a cuboid-shaped steel framework, the sides and top of which are covered by a single cover. The whole or part of the roof structure can be removed by hand, allowing loading from above as well as from the sides. These vehicles are often used by foreign companies, especially Germany and eastern Europe, for importing steel into the UK. They are less often used by companies in the UK and are best suited to long journeys, as removing and replacing the framework can be slow.

There are two other versions of the tilt trailer, one that has separate curtains on the side and the roof, which is faster to operate, and one which has a framework made of square hoops, which can be pulled back on rollers, with the cover, to one end, leaving the trailer mostly open. On these vehicles, the load is secured by the driver standing on the bed of the vehicle, but the sliding canopy can be pulled over from the ground. These trailers are designed to be used for steel. The beds of the vehicle are a slightly V-shaped floor, so that the coils are held in place. They then have flat decking on either side of the load.

One of the curtain suppliers interviewed for this study said that the tilt trailers now in use are mostly old and they are only now involved in refurbishing them, rather than supplying new ones. On these, the cover is pushed or winched open from the bed of the vehicle.

Almost all of the steel transported by road is in coils. Most of it is oiled, to help prevent corrosion, and much of it is wrapped in plastic. It is mostly roped, but it is occasionally sheeted. For instance, the higher specification products such as stainless steel are more likely to be sheeted, while others which are well oiled are less likely to corrode in a short time in transit.

The securing and covering of loads is not one of the highest risks in the steel industry. However, the industry does recognise that there are safety issues, including:

- moving over and around the load, which can be slippery due to the oil and plastic wrapping
- falling through the bed of the vehicle, which may be in poor condition
- trips due to entanglement on the back of the vehicle
- oiled chains, ropes, dunnage and vehicle beds
- falling off when pulling the sheet out
- straps and ropes breaking
- drivers getting in the way of fork lift trucks during loading and unloading.
The method used for loading and unloading may influence how the load is secured and covered. For instance, the use of vehicle mounted cranes (as in the brick industry, see section 6.6) would affect how the load is sheeted, but could reduce risks during loading and unloading.

While we were carrying out this study, a working group (including the Freight Transport Association, UK Steel Association and a number of companies involved in the manufacture and distribution of steel products) was preparing a safe operating procedure for tilt trailers. The final draft of the document had been circulated to committee members for approval. The committee intends to submit its work to the HSE for discussion after final agreement from the contributing parties.

We were unable to see a copy of the safe operating procedure, as it was still under discussion.

Also at the time this study was carried out, the National Association of Steel Stockholders was about to publish guidance called “Load Safety”, which will cover loading and unloading steel stock, and securing and sheeting of loads. The HSE has been involved in the preparation of this guidance. Again, we were unable to see a copy.

As well as steel, a range of metal products are carried on flat bed vehicles. These include gas piping, which needs to be sheeted to stop it rusting. They are similar to the hard products covered in the next section.

6.6 HARD PRODUCTS – CONCRETE, BRICKS, BLOCKS, TILES, ETC.

A wide range of hard products are transported. The vehicles used are either curtain-sided vehicles or flat beds. One of the concrete manufacturers interviewed uses flat beds fitted with drop-down side boards. One of the brick manufacturers uses flat bed vehicles with low curtain-sides. These are mainly used to improve streamlining on the vehicles and to carry the company name. They are not designed to restrain the load, although they will take some loading.

One of the concrete manufacturers interviewed is reducing the use of flat bed vehicles and now 90% of their vehicles are curtain-sided.

Many different loads are carried, including:

- concrete products such as beams, pipes, flags, kerbs etc., which are often complex loads, that are strapped or netted
- bags of cements, shrink wrapped on pallets
- strapped packs of bricks, which are increasingly being shrink wrapped
- blocks, which are packed similarly to bricks, but usually higher
- tiles on pallets, often with irregularly-shaped packs of fittings on top
- timber, which is often netted, although softwood is sheeted to keep it dry.

Most of these loads do not need to be kept dry while being transported. In the past, some types of brick have been sheeted to keep them clean and dry. However, now they are usually shrink wrapped, and they are secured either by webbing or netting.

Some companies own and operate their own fleet of vehicles. Others solely use contractors. Some products, such as bricks and concrete, are also collected by customers, using a wide range of vehicles.
Some of the vehicles used, especially for goods such as bricks which are transported in packs, have a crane mounted on the bed. This is used to load and unload the packs. The crane may be mounted in the middle of the bed, so that two nets have to be used to secure the load.

The main health and safety problems identified by the companies contacted in this study were:

- walking on the top of the load, with tripping hazards (nets, sheets, webbing, shrink wrapping, etc.) and slipping hazards (shrink wrapping), over 2 metres above the ground
- tripping over projecting parts of the load while walking on the bed of the vehicle
- small gaps (about 30cm) left in between stacks of bricks (to enable the crane to pick them up), which are too small to allow drivers to walk between them when netting, but which they can fall into when walking on top of the load
- interaction between the driver of the vehicle and the fork lift truck driver during loading, unloading, etc.
- jumping down from the top of the load to the bed of the vehicle, resulting in slips or falls
- side boards dropping down and hitting the person opening them
- cranes mounted on the backs of flat beds which can be an obstacle when netting
- netting half the load, while the other half is still being loaded by the crane mounted on the flat bed
- manual handling of sheets.

Some control measures have been put in place by the companies interviewed as part of this study and details are included in Chapter 8. The relevant trade associations do not appear to have been active in this area.

6.7 BREWERIES

The brewing industry has many similarities with the food and soft drinks industry. Most of the vehicles used are curtain-sided, which range in size from large articulated trailers to small delivery vehicles. There are two distribution stages: primary from the manufacturer to a distribution centre, using the bigger vehicles; and secondary from the distribution centre to pubs and clubs, using the smaller vehicles, often still called drays. This system allows all the goods required by the outlets to be gathered together in the distribution centres and picked so that they can be delivered in one load.

One beer company interviewed for this study has designed and developed its own vehicles. In the early 1980s they were using curtain-sided vehicles, with low beds designed to reduce manual handling. To increase security, they then moved to ‘gull wings’, which also have low beds, and solid sides that are lifted to open them. The wings fold in half on opening, allowing access to the whole of the side of the vehicle. Their latest design, the Future Big Dray (FBD), is described in section 8.3.1. At present, this company is using mostly gull wings, but will be using more FBDs in the future.

The loads include kegs, palletised shrink wrapped drinks and bottles in crates, etc. They are mostly loaded by fork lift trucks. In addition to carrying full kegs, the empty kegs are collected during secondary collections to be returned for re-use.

A variety of restraint systems are used on vehicles. Kegs are often aligned with locator boards, which stand on top of four kegs and help the fork lift truck to pick them up. Various strapping, webbing and netting systems are used, and these are described further in section 8.3.2.
One brewery interviewed owns their own vehicles, which are operated by drivers working for a distribution company. Another company operates their own primary fleet but uses contractors for secondary delivery. A third has set up a joint venture with a distribution company for both primary and secondary distribution, which uses some agency drivers.

The main health and safety problems identified by the breweries and their distributors contacted in this study were:

- loads (especially empty kegs) shifting during transit, which then lean against the curtain and can fall out when the curtain is opened
- locator boards breaking during transit, resulting in the kegs shifting
- opening stiff curtains or over-pulling on curtains, which can cause the driver to fall back if the curtain releases suddenly or to slip, especially on gravel (commonly used in pub car parks)
- jamming curtains, which have ‘flicked’ out kegs when they have released
- delivering to pubs etc., where there may be very limited access and/or the public present
- climbing on and off the bed of the vehicle
- upright poles coming out suddenly when being moved, or sticking
- wind catching the curtains of the highest vehicles during operation or when open
- interaction between the driver of the vehicle and the fork lift truck driver during loading, unloading, operation of the curtains, etc.
- the metal strips along the edge of the bed of some vehicles, causing drivers to trip or kegs to tip over
- the forks of fork lift trucks catching on the webbing used to restrain loads.

In secondary delivery, the delivery crews often work on the basis that they finish work as soon as they have finished their deliveries. This can be an incentive to work as fast as possible.

There have been major changes in distribution in this industry. Traditionally, it was an industry with a high level of manual handling injuries. There has been considerable effort to overcome this problem (the ‘ageing drayman syndrome’), the results of which have influenced all aspects of how beer and other drinks are distributed.

The companies interviewed for this study are continuing to improve how they manage health and safety in delivery. Details of a range of control measures are included in Chapter 8.

6.8 STRAW AND HAY

The majority of vehicles used to move straw and hay are flat beds. For transporting straw and hay around farms (from the field to be stored at the farm), it is unlikely that curtain-sided vehicles will be used in the future, as they are not as versatile as flat beds, which can also be used for transporting equipment, etc.

Most straw and hay is transported in large bales. Other loads are moved on farms, such as silage bales and bags of fertiliser, but the main loads are straw and hay. The bales are usually stacked to about the same height as a double stack of fertiliser bags or higher, up to over four metres.

Straw and hay is moved on farms and on longer distances by haulage companies. Legally, to prevent losing any material during the journey, all loads of straw and hay should be sheeted. In practice, many loads are only roped or strapped and are not sheeted. This happens often when
the journey is only from a field to the storage area, especially as there can be many loads
moved, for example 15 journeys per field.

Haulage companies interviewed in this study only rarely sheeted loads of straw, except for on
long journeys or in bad weather. They said it was quicker and safer not to sheet. If any
material is going to be lost, this tends to happen in the first 5 miles. One haulier described
straw as the “nasty one”. Hauliers come under pressure from the police to sheet straw, to
prevent pieces being lost on the roads.

Hay is more valuable and is more likely to be sheeted, as farmers want to keep it dry.

Roping is done from the ground, whilst sheeting involves climbing on the load.

The health and safety problems identified by the people interviewed in this study were:

- working on top of a high load, with tripping hazards such as string, and gaps between the
  bales
- movement of loads during roping, before the load has been secured
- wind catching the sheet
- snagging of ropes when they are thrown over, which may mean that the driver will have to
  climb onto the load to free the rope
- access to the top of the load.

Apart from not sheeting, the only other solution that we were told of during this study was that
some farmers now store straw at the field where it was grown, to minimise handling. However,
it will still need to be moved at some point. We failed to find any other adequate solutions to
these problems.

6.9 GENERAL HAULAGE AND DISTRIBUTION COMPANIES

This section covers haulage companies that move goods that are not specifically included in any
of the industry summaries. Some of these companies included here deal with goods covered by
one or more of the industry summaries, however they also move other loads.

The majority of vehicles used are curtain-sided, and the rest of this section concentrates on
these. Some general haulage companies do still have flat bed vehicles, but these are much less
common and are often used for specific contracts. For instance, one company runs six flat beds
for one customer manufacturing components for construction which the haulage company then
delivers to construction sites. These uses of flat beds have been covered in the section on hard
products, 6.6.

The loads carried on curtain-sided vehicles by the companies interviewed for this study
included:

- a wide range of palletised goods
- white goods, with 8 or 12 clamped together in a stack
- vacuum cleaners, carried on pallets
- clothing
- goods for DIY stores
- swarf in bins or bags
- bulk containers filled with clay slurry.
The health and safety problems that the haulage companies identified were:

- wind catching the curtains, flapping in the face of the driver, and causing drivers to have to hang on when opening them (one company described them as a ‘huge kite’)
- the centre poles sticking, springing out suddenly or not being locked in properly
- manual handling of the curtain, causing back injuries
- slippery floors causing drivers to fall when opening the curtains
- poor design of vehicles providing no safe means of access to the back of the vehicle, resulting in drivers jumping down
- drivers pulling away while fork lift trucks are still loading or unloading
- drivers walking backwards while opening curtains, possibly into the path of fork lift trucks, especially in areas with more than one loading bay
- communications with foreign drivers, who are unable to speak English
- loads shifting in transit, to lean against the curtains and possibly falling out when the curtains are opened
- the rollers on the top of curtains jamming, sometimes resulting in drivers being picked up on fork lift trucks to free them
- buckles and clips hitting drivers in the face as they open them
- ratchets slipping due to lack of maintenance.

As well as operating their own vehicles, many companies operate distribution centres. These will have a wide range of drivers and vehicles delivering and collecting loads. For instance, one distribution centre had problems dealing with tilt trailers coming from abroad. They have not yet found an adequate system of work for unloading them safely.

A few of the smaller haulage companies interviewed for this study did not consider that there were any significant health and safety issues associated with the use of curtain-sided vehicles.

However, some companies have recognised that there are risks due to the use of these vehicles and have been working towards solving them. Some of their solutions are described in section 8.3.
7 RISK ANALYSIS

In this chapter, we describe the tasks seen during the site visits. They have been grouped by vehicle type, with reference to particular industries where this significantly affects the risks involved. There is also a section covering the general factors that may affect risk levels.

Each task was recorded on video and then analysed to determine the risks involved. We have analysed the risks qualitatively, as we feel this is sufficient both to identify whether the risks should be reduced and to determine how much effort is required to fulfil legal requirements to reduce them as far as is reasonably practicable.

The criteria used (very high, high, medium or low) are used solely to compare the different tasks and are not intended to give absolute measures of risk, which could be compared to other activities. We have based the risk levels on the severity of the most likely potential injury and a rough estimation of how likely any injury is to happen. We also took into account the accident data reported in Chapter 5.

7.1 WASTE CONTAINERS

We examined and assessed three sheeting operations: a bulker, a container used for cardboard recycling and a low container used for builders’ rubble.

7.1.1 Trimming and sheeting a bulk waste container

The task consisted of trimming and sheeting a 90 cubic yard bulk waste container. It had been loaded from the top with general household and commercial waste by a mechanical shovel at a waste transfer station, as shown in Figure 1 and Figure 2.

![Figure 1](image1.png)

**Figure 1**

*Loading a bulk waste container*

During most of the loading process, the driver stayed in his cab, to keep out of the way. However, the considerable buffeting caused by loading meant that the driver was thrown around inside the cab and he left the cab before the loading finished.
The driver sheeted the vehicle while wearing a harness that was connected to fall arrest equipment on a gantry. However, we have assessed the task as if he was not wearing a harness, as this is the worst case for this task. The driver stated that if he had not been wearing a harness, he would have carried the task out in the same way, and that he would have to “be careful”. Details of the use of the gantry and harness are given in section 8.1.3.

The driver climbed onto the bulker using the steps built into the vehicle (see Figure 2). He then stepped into the tray mounted onto the front of the waste container where the sheet was stored. He cleared out the pieces of rubbish left in the tray, picked up the sheet (a net with a small mesh size) and lifted it up to the top of the load. The sheet was fairly light and did not appear to require much effort to put it on top of the load.

The driver climbed onto the top of the load from the sheet tray. Before unrolling the sheet, he first trimmed the load to remove the rubbish that was hanging over the edge of the container. He did this by walking around the edge of the load, mostly with one foot on the edge of the container and the other in the load. At the same time, he had to bend over to either pull the rubbish hanging over the side into the load or to throw it to the floor below.

While doing this, he frequently rested one hand on the rubbish and leant his body towards the rubbish, away from the edge. However, he sometimes needed both hands to remove the rubbish, for instance when having to tear a piece of cardboard. This meant he was standing on the edge of the container, while bending over and applying force. He also used his foot at times to remove rubbish, by kicking it or pushing it along the edge.

After trimming the load, the driver climbed onto the rubbish and picked up part of the sheet and pulled it towards the rear of the vehicle, while waking backwards for a short distance. He then got hold of the end of the sheet and walked to the rear of the vehicle, while facing the rear and pulling the sheet behind him. While standing sideways on the rear edge of the container, he
fully pulled out the sheet. He unfolded the sides of the sheet, either by throwing them out or by standing on the edge of the container and pulling the sheet towards himself.

He then walked forward, over the sheet, and finished throwing out the sides at the front of the vehicle, again whilst standing on the edge of the container. He climbed off the container by stepping down into the sheet tray, and then climbing down the steps. He tied down the sheet from the ground. Figure 3 shows the vehicle after sheeting.

The driver stated that he did have to sheet his vehicle at other sites without a gantry. He would have to unsheet the vehicle at the landfill site, where there is no gantry, by going up on top of the load and rolling the sheet up. The main difference between sheeting and unsheeting was that he only had to trim the load when sheeting. He was unable to pull the net off without climbing on to the load as it could snag on the load. He also found the net was “not too heavy” but became a problem if it got wet. Adverse weather also affected the task by making the load more slippery and if it was windy when unsheeting.

The driver wore safety boots, overalls, gloves, a high visibility jacket and a hard hat.

The hazards identified while analysing this task are listed in Table 1 below. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur.
## Table 1
Risk analysis for sheeting a bulk waste container

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>Very high</td>
</tr>
<tr>
<td>Walking on an uneven surface, with voids, slipping and tripping hazards</td>
<td>Fall from height</td>
<td>Very high</td>
</tr>
<tr>
<td>Working at a height of about 4 metres above ground level, often standing, bending down, walking or pulling while on the edge of the load and container</td>
<td>Fall from height</td>
<td>Very high</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>Very high</td>
</tr>
<tr>
<td>Climbing on and off the container</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Walking in and on dangerous loads, including sharp objects, etc.</td>
<td>Contact with dangerous objects</td>
<td>Medium</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while in stooped and/or twisted posture</td>
<td>Strain/sprain, cumulative damage</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### 7.1.2 Sheetng a cardboard container

The task consisted of sheeting a free standing 35 cubic yard container which had been filled with cardboard by the general public at a civil amenities site. The cardboard had been thrown into the container by people bringing it in for recycling. A set of step ladders was provided by the site to enable people to load the container, as shown in Figure 4. In order to try to evenly and fully load the container, the steps are repositioned occasionally as the container is filled. However, at this site, due to a lack of space, the steps could only be positioned at the ends of the container.

Manual sheeting of such containers is carried out on the ground before the container is loaded onto a rollonoff vehicle. This transports it to where the cardboard is sorted and amassed before being taken to paper mills. Other types of waste, including green waste, are also collected in similar containers and transported on rollonoff vehicles.

The container was overloaded, extending above the top of the container, at the end the step ladders were, as the boxes could only be thrown in from the end. The driver first threw the sheet up onto the top of the load, apparently easily as it was a lightweight small mesh net. While doing this, the driver had to stand in the area where people were driving cars into the civil amenity site to leave rubbish.

He then climbed up the container ladder and into the container. Figure 5 shows the container ladder. This was manufactured by welding 20 mm diameter rod across the 750 mm gap between the strengthening ribs of the container. The intended gap between the rung and the container was 75 mm, however due to damage this was frequently reduced. On this container, the gap had been reduced to 40 mm in places. On other containers on the site, damage had reduced the gap even further, as shown in Figure 6.
A gap size of 75 mm, plus half the diameter of the rung, gives a depth of 85 mm for the front of the foot of the person climbing the ladder. If it is damaged, this would be reduced. This distance is not included in standard anthropometric tables, however we have calculated that a depth of 125 mm would accommodate 90% of the population. This is without shoes. Anyone climbing the ladder should be wearing safety shoes, which will make the problem worse. There is no current legislation relating to these containers, however, in the past a minimum clearance of 4.5” (114 mm) was required behind each tread on a ladder onto a ship (the Docks Regulations
The distances on the containers seen were well below both this requirement and the calculated depth. Instead of being able to place the ball of the foot on the rung, only the toes can be used. This considerably increases the risk of someone slipping off the ladder.

Before being able to sheet the container, the driver had to improve how it was packed by moving some of the cardboard. He also trod down some cardboard to improve the stability of the load.

He threw the sheet out as much as possible from where he first climbed into the container. He then had to move around the load in order to throw the rest of the sheet out. Due to variations in the level of the load, this meant he had to climb up and down on the cardboard. Although the sheet was light, moving about on the load could only be done slowly and the task was visibly hard work due to the difficulty of moving on the load. At times he adopted a stooped posture in order to reach the sheet.

While throwing out the sheet, he stayed close to one edge of the load, as he had achieved a fairly stable spot to stand on. When he did have to move, at one point he ‘sat down’ in the load when he lost his footing. Having pulled out the sheet as much as possible while standing in the load, he then climbed onto the sheet to throw out the rest of the sheet. He threw out the end of the sheet while standing on the corner of the container, just before climbing onto the ladder. He pulled the last corner of the sheet out while standing on the ladder, and then climbed down.

He tied down the sheet on all sides, from the ground. It should be possible to unsheet such a load from the ground, however the driver would have to climb up if the sheet got snagged on the load.

Similar tasks would be carried out on other containers up to a capacity of 50 cubic yards. The size of container used depends on the type of load, with the larger containers being used for the lightest loads.

The driver stated that it was possible to sheet such containers from the ground by two people using poles. However, this was rarely done, as it needed someone from the site to assist the driver.

The driver wore safety boots and a high visibility jacket.

The hazards identified while analysing this task are listed in Table 2 below. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur.

### 7.1.3 Sheeting and unsheeting a low waste container

The task seen was sheeting a low 15 cubic yard container full of rubble, as shown in Figure 7. This was on a civil amenity site and had been filled by members of the public. Heavy loads such as rubble are usually collected in smaller containers so that the payload of the vehicle is not exceeded.

This visit had been intended to show how one of the mechanical sheeting devices was used. It was mounted on the ‘goose neck’ (the hooked arm used to lift the container) of a rollonoff vehicle, as shown in Figure 39 in section 8.1.2. Mechanical sheeting devices are covered in section 8.1.2.
Table 2
Risk analysis for sheeting a cardboard container

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall into load or from height</td>
<td>Very High</td>
</tr>
<tr>
<td>Walking on an uneven surface, with voids, slipping and tripping hazards</td>
<td>Fall into load or from height</td>
<td>High</td>
</tr>
<tr>
<td>Working at a height of over 2 metres above ground level, often standing, walking or pulling while near the edge of the load and container</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Climbing on and off the container</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Walking in and on dangerous loads, including sharp objects, etc.</td>
<td>Contact with dangerous objects</td>
<td>Medium</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while stooped or in other awkward postures</td>
<td>Strain/sprain, cumulative damage</td>
<td>Medium</td>
</tr>
</tbody>
</table>

However, the driver had not used this device before and had not been trained in its use. Instead of sheeting the load from the ground, he climbed into the container and sheeted it semi-manually. This enabled some of the risks associated with manually sheeting a low container to be assessed. It also enabled us to see some of the risks that may be associated with drivers using mechanical sheeting devices which they have not been trained to use.

The driver climbed into the load over the side of the container, at the far end from the sheeting device. As he had had to start to pick up the load in order to be able to use the sheeting device, this was now the lowest access point. The container did not provide any other means of access. He walked over the load to reach the sheet. He pulled it out at first by twisting while walking forwards, then by pulling it behind him. At the far end, he attached it to the container.

He then found it difficult to get out of the container because the bar at the end of the sheet was in the way, forcing him to clamber around the edge of the load. He then climbed onto the edge of the container and jumped out. The side was 1.3 metres high and jumping off it was clearly painful for the driver. Figure 8 shows the container after sheeting.

He then attached the sheet to the sides of the container using the ropes incorporated in the sheet. To unsheet, he again climbed into the container and walked the sheet to the front of the container, while it rolled up on the device.

These mechanical sheeting devices are intended to remove any need for the driver to climb inside the container. He should have had a rope and a pole to allow him to pull out the sheet from the ground. These were not on the vehicle. He should have unsheeted by undoing the sheet and allowing the device to roll itself back up. Further details of these devices are given in section 8.1.2.
It is not clear whether these low containers can be sheeted manually from the ground. In this case, the driver would have sheeted it manually while standing inside the container. However, a different waste company informed us that this was not necessary, and that 15 and 18 cubic yard containers could be sheeted from the ground.

The driver was wearing safety boots and a high visibility jacket.

The hazards identified while analysing this task are listed in Table 3 below. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur. The actual task seen was assessed, and only some of the risks would be the same as for manual sheeting.
### Table 3
Risk analysis for sheeting a low container

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking on an uneven surface, with slipping and tripping hazards</td>
<td>Fall into load or from 1.3 metres</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Working at a height of about 1.3 metres above ground level, sometimes near the edge of the container</td>
<td>Fall from 1.3 metres</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Jumping off the container onto the ground</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
</tr>
<tr>
<td>Walking in and on dangerous loads, including sharp objects, etc.</td>
<td>Contact with dangerous objects</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### 7.2 FLAT BED VEHICLES

A very wide range of loads are transported by flat bed vehicles. In this study, we visited two fertiliser manufacturers and one brick manufacturer. Although it was not possible to view a wide variety of loads being sheeted, it is possible to extrapolate the risk assessments of the tasks seen to other loads.

#### 7.2.1 Sheeting fertiliser bags

Three vehicles loaded with a single stack of 500 kg bags of fertiliser were seen being sheeted. One of these was manually sheeted outside without any protective systems, and we have based the assessment mainly on this task. Two others were manually sheeted under cover while the drivers were wearing harnesses attached to a gantry. For this section, these have been included in the assessment where relevant, as if they were being sheeted without the protective equipment. Wearing the harness apparently only made minor changes to how the sheeting was done, and these are included in the description of the task.

All of the vehicles were owned by haulage companies. All three were loaded in a loading area and were then driven with the load unsecured to the sheeting area. On one site, this was in a car park, outside the security gates but within the site’s boundaries. There was no cover on the car park, and the driver parked his vehicle close to the far end, close to a row of trees that gave some shelter from the wind. There was a fairly strong breeze. The other two vehicles were sheeted under shelter.

For the one vehicle sheeted without a harness, the driver climbed onto the rear of the tractor unit (below the level of the bed itself) and then onto the top of the single stack of fertiliser bags. When dismounting, he jumped on to the lower part of the vehicle and then onto the ground. During this study, we noted that the design of some of the tractor units used with flat bed trailers include access steps and some do not. Figure 9 shows a vehicle with access. One driver used part of the lift truck that he had mounted on the rear of his vehicle to stand on, as shown in Figure 10.
The three drivers used a variety of techniques to lay out the sheet over the top of the load. All of them started by stooping down to undo the first few folds. One driver then rolled out the majority of the sheet towards the rear of the vehicle, by walking forward on the sheet while stooping down to unroll it, as shown in Figure 11.

The second driver combined this technique with occasional kicks to unroll the sheet away from him while standing relatively upright. The third driver opened up most of the sheet by dragging the sheet behind him, firstly holding it in one hand. After losing his grip on it, he altered this to
pulling it with both hands. This meant that although he could do this without stooping, he was twisting while pulling. The exact actions of these two drivers may have been influenced by the harness they were wearing, however, it is likely that a variety of actions are used by drivers when sheeting.

All of the drivers at some point stood and walked close to the ends and sides of the load. All of them stood on the last two rows of bags at the rear of the vehicle to throw the sheet over the end of the load, as shown in Figure 12. Two of the drivers had to stoop to flatten down the loops (used by the fork lift truck during loading) on the last few rows of bags at the back of the vehicle before covering them with the sheet, see Figure 13.

![Figure 12](Image)

**Figure 12**

*Standing on the last two rows of bags*

The third driver slightly misplaced the sheet to start with, and when he realised this, he pulled it towards the rear of the vehicle, while standing on the last row of bags and stooping down, facing the front of the vehicle.

All of the drivers threw the sides of the sheet over the sides of the load while stooping down, as shown in Figure 14. One of them (without a harness) walked either on the sheet or on the bags along the sides on the vehicle while unfolding the sides, while the others walked along the centre of the load, over the sheet.

The driver who sheeted outside tied down the two front corners of the sheet before unrolling the sheet to the far end of the load. This was because of the wind, to ensure it was attached be when only a small amount of sheet was unrolled.

After sheeting, all of the drivers pulled out the corners of the sheet to locate it properly, then tied it down and threw ropes over to secure the load. When pulling the corners out, all of the drivers used both hands while leaning backwards. Only one of the drivers put one foot behind the other to provide a more stable base while pulling. Figure 15 shows a sheeted vehicle.

All of the drivers wore safety shoes and high visibility jackets. A sheet weighs 40 to 50 kg.
The hazards identified while analysing this task are listed in Table 4 below. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur.
### Table 4

**Risk analysis for sheeting bags of fertiliser**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Walking on an uneven surface, with tripping hazards</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Working at a height of about 2.3 metres above ground level, often standing, walking or pulling while close to the edge of the load</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Jumping down from the load to a low part of the vehicle and then onto the ground</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while in stooped and/or twisted posture</td>
<td>Strain or sprain, and cumulative damage</td>
<td>Medium</td>
</tr>
<tr>
<td>Pulling out the corners of the sheet while leaning backwards</td>
<td>Fall backwards if straps fail or lose hold</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Other risk factors**

There are a number of factors which could affect the risks in Table 4. For instance, the location will influence the potential effects of the weather. If shelter is provided, which was of prime concern to most of the drivers interviewed, then the risk of falling would be reduced. When sheeting outside, drivers said that they took note of which way the wind was blowing and parked to minimise its effects.

The fertiliser manufacturer that we visited who had not installed gantries said that they did allow drivers to sheet up in their storage shed if the driver asked to, because of the weather.

However, it would not have been possible for all drivers to sheet under cover on this site in the busy season, where there could be up to 30 flat bed vehicles collecting loads per hour. In addition, two of the haulage companies that we interviewed that collected from this site stated that they were sent to an outside car park (where we saw a vehicle being sheeted) to sheet up. One said that he had been “moved on” when he had tried to sheet under cover on this site.

Some fertiliser manufacturers double stack the bags to achieve a full payload, adding a few bags on the top layer. If this is done, the driver has to walk on the edge of the single stack to get past the second layer of bags, which will increase the risk of falling off the load to very high.

An alternative method of sheeting followed by some drivers is to sheet each part of the load after the fork lift truck has put it in position. This means that after each load of six bags (two rows) had been loaded, the driver pulls the sheets over them, while standing on the deck of the lorry. At the same time, the fork lift truck picks up the next six bags. This is repeated until the load is complete.
Although this reduces the risks to the driver from working at height (the deck height is about 1.4 metres) and on an uneven surface, it does present a considerably increased risk of the driver being struck by the forklift truck or the load itself. This does not appear to be a safer alternative.

There is also a risk of shedding part of the load when travelling between where the vehicle is loaded and where it is sheeted. In the case of the driver who had to drive to an outside car park to sheet his load, this appears to be an unnecessary extra risk. However, if the vehicle is being driven to a sheltered location with extra protective equipment, then we believe that the risk of driving with the load unsecured for a short distance would probably be justifiable.

**Unsheeting**

We asked drivers how they unsheeted. One driver stated that he always unsheeted by pulling it off from the ground, and a second driver said that he usually did that except where the floor was dirty or it was too windy. A third driver said that he usually unsheeted from the top of the load as the floor was rarely clean in the farms he delivered to. Another driver said that he always unsheeted from the top of the load.

Unsheeting from the ground would reduce most of the risks, except from manual handling and the wind. However, removing the highest risks associated with climbing onto the load means that this is the best option. Unsheeting from the top of the load presents similar risks to sheeting.

**7.2.2 Brick manufacturer**

During a visit to a brick manufacturers, we were unable to see a vehicle being netted. However, it was possible to view a loaded vehicle and to discuss the task with health and safety personnel who had carried out a risk assessment.

Bricks are usually loaded and netted as shown in Figure 16. Two stacks of bricks are placed across the width of the vehicle bed. How much space will be left between the bricks or along the sides of the bricks depends on the size of the stacks. Bricks are usually stacked either four or five bricks wide. These are referred to as four or five ‘blades’. A stack is 1 to 1.1 metres high, which means that the top of it is about 2.4 to 2.5 metres above the ground.

Figure 17 shows five blade stacks. A gap has been left down the centre of the load so that the bricks can be loaded and unloaded by the crane mounted on the vehicle. This gap was about 30 cm on the vehicle in Figure 17. There is no space left along the edges of the vehicle, and the gap in the centre is too small for the driver to walk down while netting the load. In this case, the driver has to walk on the load to sheet it.

When bricks are stacked in four blades, the gap down the centre may be bigger and it may be possible for the driver to walk down this to net the load, although the driver is constrained and it is difficult to unroll the nets. With four blades, there are also gaps left along the edge of the vehicle bed. Some drivers walk down this while netting, however, the brick manufacturer that we visited has decided that the risk of falling off when walking down the side of the vehicle is too high and that walking on top of the load while netting is safer, as falls are less likely, although the outcome may be more severe.
In practice therefore, whatever the size of the brick pack, drivers net from on top of the load. This means that most of the risks involved are similar to those presented by sheeting bags of fertiliser. The height is similar to a single stack of fertiliser bags. Although bricks are more stable than fertiliser and of a more regular shape, there are still tripping hazards on the load. It is possible to catch a foot in the netting and trip. It is also possible to fall down the gap between bricks. The load can also be slippery because of the shrink wrapping, especially when this is wet.

There are some differences from sheeting fertiliser that affect the risks involved. Instead of sheets, nets are mostly used, which weigh less and are easier to handle. Some vehicles are fitted with a crane, and when this is centre mounted, the two parts of the load have to be netted separately. Drivers sometimes net one part of the load while the other part is still being loaded.
On vehicles without cranes, fork lift trucks are used to load the stacks. Accidents have occurred when drivers have driven off while their vehicles are still being loaded.

The hazards identified while analysing this task are listed in Table 5 below. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur.

### Table 5
Risk analysis for netting bricks

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Walking on an uneven surface, with tripping hazards and gaps</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>Working at a height of about 2.4 metres above ground level, often</td>
<td>Fall from height</td>
<td>High</td>
</tr>
<tr>
<td>standing, walking or pulling while close to the edge of the load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netting part of the load while the rest is still being loaded</td>
<td>Struck by the crane</td>
<td>High</td>
</tr>
<tr>
<td>Driver moving vehicle during loading by fork lift truck</td>
<td>Fork lift truck overturning</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Jumping down from the load to a low part of the vehicle and then</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
</tr>
<tr>
<td>onto the ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulling out the corners of the sheet while leaning backwards</td>
<td>Fall backwards if straps fail or lose</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>hold</td>
<td></td>
</tr>
</tbody>
</table>

#### 7.2.3 Other loads

If the covering and securing of loads on flat bed vehicles requires people to work on top of the load or the bed of the vehicle, without any controls to prevent or minimise the effects of falls, then there is a risk of falling which could result in serious injuries, whatever load is involved. We believe that the risk analyses in the two preceding sections are applicable to loads other than fertiliser and bricks.

There are some factors in some of the industries examined in this study that will have some affect on risk levels. For instance, we identified the following factors that could increase the risk levels in some industries:

- the height of straw stacks
- difficulties in achieving and maintaining a stable load (see section 7.2.4)
- the presence of slippery materials, such as oil, plastic, etc.
7.2.4 Securing loads

For the risk analysis described above, the relevant accident data were taken into account. However, four of the accidents occurred where the driver was struck by the load when he was unsecuring it while standing on the ground. These illustrate that even if drivers do not need to climb onto the load or the bed of the vehicle, and are able to secure it from the ground, there are still risks.

The accidents appear to have been due to either the load moving during transit or to unsafe loading and stacking techniques. Safe loading of vehicles is clearly a major health and safety issue, both from the point of view of the drivers and also the general public who may be affected if loads are lost while in transit.

7.3 CURTAIN-SIDED VEHICLES

As for flat bed vehicles, a wide range of goods are transported by curtain-sided vehicles. These vehicles are not as versatile as flat beds, as they cannot be loaded from above, however, they give quick access to the full length and rear of the trailer. They are quicker to use than flat beds and give better load protection and containment, although restraining loads can be difficult.

In this study, we visited three distribution centres: one operated by a soft drinks manufacturer, one by the distribution wing of a brewery company and one by a distribution and haulage company. A range of vehicles were seen being unloaded and loaded.

The risk analysis has been split into two sections. The first deals with the general use of curtain-sided vehicles, which will cover the majority of risks for most uses. The second section covers the risks found in specific industries, such as paper and board, and brewing.

7.3.1 General risk assessment for the use of curtain sided vehicles

This covers the risks associated with the use of curtains and some of the risks associated with loading and unloading. It is not intended to be an exhaustive assessment of all the risks associated with the use of curtain-sided vehicles, as it does not cover load restraint in depth, or the distribution of loads in the vehicles, etc.

This assessment uses information from all the visits made, plus the accident data in section 5.3.

All the vehicles seen had buckles and clips at frequent intervals along the length of the vehicle, which are used to fasten the curtain to the bottom edge of the trailer. Figure 18 shows a vehicle with the curtain closed. The curtains all had poles at each end, which are inserted into the top and bottom of the trailer. The curtain is then tightened on these poles using a ratchet. The larger vehicles had a centre pole on each side of the vehicle. These help to support the roof. In order to allow access to the whole side of the vehicle, these poles can be unattached from the bottom edge, so that they are only connected at the top. They can also be slid into an alternative position. Figure 19 is of the same vehicle as in Figure 18, with the curtain open, showing the centre pole. Figure 20 shows another open vehicle of a slightly different design.

All the drivers seen used the same basic method of opening a curtain. First, they undid all the clips along one side, so that the curtain was only held in place by the poles at each end. One pole was then released by lifting it free of the bottom edge and then pulling it free from the top edge. The curtain was then pulled open, by the driver grasping one or two straps and walking or almost running backwards, while leaning back. This means that they opened the curtain
while keeping it between themselves and the load. The number of pulls they made depended on the size of the vehicle. One driver took four pulls to fully open the whole of one long vehicle.

All except one of the poles were moved easily. The exception was that one driver had to pull a pole five times before it came out.

![Vehicle with closed curtain](image18)

**Figure 18**
Vehicle with closed curtain

![Vehicle with curtain opened, showing palletised load](image19)

**Figure 19**
Vehicle with curtain opened, showing palletised load
One driver was seen opening a curtain on a windy day in an unsheltered area. As he was opening it, the wind was blowing diagonally through the trailer (he had already opened the other side) towards the driver. The curtain billowed out as he opened it, and was blown toward his face, including the front edge of the curtain that contained the front pole. On this site, the operator required all curtains to be opened and strapped back before the vehicles were moved into the loading bays. Figure 21 shows vehicles parked on this site, ready for loading.

Most of the drivers pulled the curtains open using two straps, one held in each hand. Two drivers were seen opening at least part of the curtain by pulling on only one strap, while leaning and almost running backwards.

At two of the sites, the curtains were fully opened before loading or unloading started. The drivers then sat in their cabs until the vehicle was loaded or unloaded. At one of these sites, if the fork lift truck driver needed the assistance of the vehicle driver (for instance, to move one of the centre poles), he would go to the cab and stop loading until the driver had finished what he needed him to do. Drivers at this site wore safety shoes and high visibility jackets.

At the other site where the drivers sat in their cabs during loading and unloading, the drivers opened their curtains after they drove into the bay. However, the bays were close together, which meant that there were fork lift trucks working in the area as he was walking backwards opening the curtain. When he was fastening back the first side, the rear of a fork lift truck that was unloading the adjacent vehicle came very close to the driver, making him hurry out of its way. This driver was wearing safety shoes, a high visibility jacket and a hard hat.

However, at the third site, one driver opened and closed his curtains while the vehicle was being unloaded by a fork lift truck. He opened one side first, then he opened the second side while the fork lift truck starting unloading from the other side. As he started doing this, he was standing on the other side of the load to the fork lift truck and invisible to its driver.
He was also hidden from the fork lift truck driver who was still unloading on the other side of the vehicle when he took out the centre pole. This driver worked for a different company to the one operating the site. He was wearing safety shoes but not a high visibility jacket.

Later during the unloading of the same vehicle, the driver pulled the curtain back to the rear of the vehicle, so that the fork lift driver could access the last two pallets at the front of the trailer. As soon as these have been lifted off the bed of the vehicle, but before the fork lift truck is completely clear of the load, the driver closes the curtain. At this point, he was close to the rear of the fork lift truck while it was moving.

At the same site, a vehicle with two trailers was seen being loaded, as shown in Figure 22. The driver fully opened the curtains on one side of the vehicle before loading started. However, he then directed the fork lift truck driver while he was loading the vehicle. He walked and stood close to the fork lift truck driver, talking to him as he was loading pallets of goods on the trailer. This driver worked for the company that operated the site. He wore a high visibility jacket and safety shoes.

At this site, emphasis was placed on fast turn around times, to maximise the usage of the loading bays.

During some loading operations, the driver of the vehicle does need to be involved in how the vehicle is loaded. He will be responsible for the safety of the load while it is in transit. He is usually more aware of the capability of the vehicle and should know how to distribute the load properly to ensure it is stable.

Although this was not seen, we are aware from our interviews and from talking to drivers that they sometimes have to climb on to the bed of the vehicle. Most curtain-sided vehicles do not have any means of access. Drivers of smaller vehicles used for deliveries to pubs and other
outlets frequently have to go onto the back of the vehicle. During one visit, we saw small curtain-sided vehicles with metal bars along part of the length of the vehicle, below the edge of the deck. This is shown in Figure 56 in section 8.3.7. These are intended to help the drivers access the back of the vehicle, however they are narrow and can be slippery.

![Figure 22](image)

**Figure 22**

*Loading a vehicle with two trailers*

The hazard identified while analysing these tasks are listed in Table 6 below. We have considered the worst case – all of the risks seen have been included although we believe it is unlikely that they would all occur on the same sites. For each hazard, the possible outcome has been identified. We have also included an approximate risk level, to allow comparison between different hazards and tasks. The risk levels are based on both the severity of the most likely injuries that could occur and the likelihood that any injury will occur.

The risks associated with the driver working in the vicinity of the fork lift truck while it is loading or unloading the vehicle were much more of a concern to the users of curtain-sided vehicles than flat beds. We are not sure why, but it may be because there is poorer visibility around curtain-siders, or because the risks associated with sheeting are higher with flat beds, so that the risk from the fork lift truck is not perceived to be high.

There are a number of factors which will affect the risk levels identified here. For instance, they may be altered by the exact type and size of vehicle, the load, the layout of the loading bays, the amount of shelter, etc.
Table 6
Risk analysis for loading and using a curtain-sided vehicle

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in the same area as operating fork lift trucks, often behind them and often walking backwards</td>
<td>Struck by fork lift truck or load</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Driver moving vehicle while fork lift truck still loading or unloading</td>
<td>Fork lift truck overturning</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Talking to the fork lift truck driver while loading vehicle, which could distract the fork lift truck driver</td>
<td>Struck by fork lift truck or load dropped</td>
<td>Medium</td>
</tr>
<tr>
<td>Falling off the bed of the vehicle</td>
<td>Falling a short distance</td>
<td>Medium</td>
</tr>
<tr>
<td>Climbing on and off the vehicle, including possibly jumping down to the floor</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
</tr>
<tr>
<td>Pole sticking and releasing suddenly</td>
<td>Struck by pole</td>
<td>Medium</td>
</tr>
<tr>
<td>Wind blowing the curtain while it is being opened</td>
<td>Struck by curtain, pole or buckle</td>
<td>Low to medium</td>
</tr>
<tr>
<td>Pulling strap on curtain with one hand, while leaning backwards</td>
<td>Fall backwards if strap fails or lose hold</td>
<td>Low</td>
</tr>
<tr>
<td>Curtain jamming when being opened or closed</td>
<td>Fall backwards if curtain frees or if driver slips</td>
<td>Low</td>
</tr>
</tbody>
</table>

7.3.2 Specific risk factors
The general risk assessment in the preceding section does not include risks which are specific to certain industries. The ones that we identified in the study are analysed in this section.

Paper and board
The main risk reported by paper manufacturers was loads shifting during transit, so that part of the load rests against the curtain. When the curtain is opened for unloading, the load can fall out. This was supported by the accident data, which included three accidents where paper bales or reels shifted and fell out, hitting the driver.

Loads can shift if they have not been secured, if they have been poorly secured or loaded, or if waste paper has been badly baled, and the bale collapses during transit. Paper bales and reels are difficult to secure.

The assessment of this risk is shown in Table 7, and is in addition to the risks shown in Table 6.
Table 7
Additional risks when using a curtain-sided vehicle to carry paper

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load shifting during transit and leaning against the curtain</td>
<td>Load falling when curtain is opened</td>
<td>High</td>
</tr>
</tbody>
</table>

*Brewing*

Like paper reels and bales, it was reported by the brewing companies that kegs can be difficult to secure and can shift in transit. They can then fall out when the curtains are opened. This can be caused by poor securing of the load or the locator boards breaking. Again, this was supported by the accident data, where two of the accidents involved kegs falling out and hitting the driver.

There are other risks specific to the brewing trade. Companies reported that curtains have jammed then ‘flicked’ out empty kegs. Some of the smaller vehicles used for secondary distribution have thin metal strips along the edges of the beds of the vehicles which help restrain the load, as shown in Figures 23 and 24. However, drivers have tripped over these while on the bed of the vehicle. It is also possible that barrels may be more likely to tip over because of these strips.

The assessment of these risks is shown in Table 8, and are in addition to the risks shown in Table 6.

Table 8
Additional risks when using a curtain-sided vehicle to carry beer

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load shifting during transit and leaning against the curtain</td>
<td>Load falling when curtain is opened</td>
<td>High</td>
</tr>
<tr>
<td>Curtains flicking out kegs</td>
<td>Struck by falling object</td>
<td>Medium</td>
</tr>
<tr>
<td>Kegs tipping over on metal strip</td>
<td>Struck by falling object</td>
<td>Low to medium</td>
</tr>
<tr>
<td>Drivers tripping over metal strip</td>
<td>Fall from bed of vehicles</td>
<td>Low</td>
</tr>
</tbody>
</table>

Some of the risks of secondary distribution can be increased by the location of pubs, clubs, etc. As well as the risk of kegs hitting the crew of the vehicle, there may be members of the public in the area during unloading.
7.4 OTHER FACTORS

During this study, we discovered a number of factors which could affect all vehicles types and industries. Although it is not possible to carry out a risk analysis for these factors, they could affect many of the risks described in the rest of Chapter 7.
**Contractors**

All the industry sectors that we examined in this study involve the use of contractors to some degree. Some, such as the fertiliser industry, mostly use haulage companies. As the work is seasonal, many different hauliers will be used in the busy periods.

Even companies who operate their own fleet may have to deal with contractors and other drivers. For instance, waste companies who operate landfill sites have little control over who visits the site. Haulage companies that operate distribution centres will have many different drivers delivering or collecting from the centre, including foreign drivers.

Overall, controlling drivers working for other employers and self-employed drivers can be extremely difficult. Where sites require visiting drivers to comply with their site procedures for sheeting and securing loads, then they have to ensure that all drivers are aware of them, can understand them and comply with them.

In many cases, the site operator has the power to refuse to use a haulage company if their drivers do not comply with site safety requirements. This becomes more difficult where the site operator cannot choose who uses their sites, as in the waste industry. However, they still have a legal duty to enforce their safety rules.

**Customers and suppliers**

In some of the industries examined, their customers can affect the risks taken by drivers. The most obvious example is in the waste industry, where overfilling and uneven loading of containers can increase the risks to the drivers when sheeting.

Again, often the company involved has the power to refuse to collect waste if they consider it to be too hazardous to the driver to sheet. However, financial considerations may sometimes prevent this happening.

**Competence of drivers**

Concerns were raised by the Freight Transport Association about the skill levels of drivers of heavy goods vehicles. They believe that there is a shortage of competent, skilled drivers. In the past, drivers have learnt skills such as sheeting by being apprentices, however this no longer happens. The FTA do run training courses to teach drivers to secure loads, but not how to sheet, although they are able to do so.

At present, the HGV driving test only covers driving skills, and does not include any other skills relating to the use of vehicles. Tests are taken on unloaded vehicles. Drivers can pass on the simplest vehicle and are then allowed to drive the most complex vehicles, fully loaded. Some driving schools may offer training in other skills such as roping and sheeting, but these are not legal requirements.

At present, the Driving Standards Agency is considering a log book scheme for HGV drivers. The log book would show what experience the driver had, including the types of vehicles driven, sheeting and securing of loads, etc. However, this scheme is at present only under discussion and would take a long time to bring in, as it would require extensive consultation, with many stages to go through.
Vehicle life

Some of the problems described in this report are due to the design of the vehicles in use. How fast these will be replaced depends on what type of vehicle they are and how they are used.

Tractor units used by blue chip companies would be expected to last about 5 years. However, trailers would be expected to last about three times as long as this, for 15 to 20 years. In this time, they may be downgraded to lighter duties. It is likely that some haulage companies will keep trailers operating for longer than this.

In the waste industry, rollonoff vehicles would be expected to be used for about 7 to 9 years. However, containers will last longer and some of the ones that we saw in this study were in very poor condition but were still being used.

It is likely that any solutions that rely on new trailers or other equipment being bought will take many years to be effective. There is more chance of equipment solutions being used if they can be retro-fitted to existing vehicles.

Access to vehicles

Other than waste vehicles and the larger waste containers, the design of many vehicles currently in use does not include any form of steps to allow the driver safe access to the bed of the vehicle.

This increases the risk of drivers slipping when climbing onto vehicles, and encourages them to jump off, possibly causing feet and leg injuries.
8 ASSESSMENT OF SOLUTIONS

One of the key objectives of this study was to identify any solutions that have been devised to reduce the risks from the common or industry unique problems. We discovered a number of different control measures, some of which were already in use, some under development and some only under discussion. In addition, we have included some potential solutions that should be considered in relevant industries as they may represent good practice and allow legal compliance.

We analysed these solutions to determine whether they adequately addressed the risks identified. They were compared with both legal requirements and good practice, based on the published HSE guidance, where applicable.

We examined solutions that apply to one type of vehicle or are found in a particular industry to determine whether they have wider applications. We also considered whether solutions such as auto-sheeting devices need to be implemented by vehicle manufacturers or can be retro-fitted by the vehicles owner/operators.

This chapter is arranged by vehicle type. For each vehicle, the possible solutions have been considered in approximate order of effectiveness. Where possible, the risk analyses presented in Chapter 7 have been repeated, showing how the solutions affect the risk levels.

8.1 WASTE CONTAINERS

We found more potential and actual solutions in this industry than any other. This appears to be due to a combination of the highest risks, the worst accidents, pressure from the enforcing authorities (including prosecutions of site operators) and the active involvement of the members of a trade association.

8.1.1 Alternative vehicles and containers

The risks associated with sheeting and unsheeting loads in the waste, recycling and scrap metal industries are so high that the need to temporarily cover loads while they are in transit needs to be eliminated. The legal requirements to contain and secure loads, combined with the nature of the loads means that they must be completely contained, so the solution must be to ensure that this is done without having to provide temporary containment.

This could be achieved by using alternative vehicles and containers that contain the load without the need for sheeting. There are a range of these already available.

For instance, at some locations such as airports, containers for collecting cardboard or paper need to be covered at all times because it is highly likely that the contents of an open container will be blown out. Containers with sliding or rolling roofs are available, with two covers which slide across each other, as shown in Figure 25. Half of the container can be opened at a time for filling. When the container is full, the roofs are used to fully contain the load and there is no need to sheet. The roofs also prevent overloading. These containers cost about 50% more than open ones.
There are many other designs of containers and skips that include containment. Some include compactors which compress the load, increasing the capacity. It appears that more will become available, and there may be more pressure to use these containers to protect the environment.

![Waste container with sliding roofs](image)

There are also vehicles available which do not require sheeting. We interviewed one paper and card recycling company that is working towards using as many rear-end loaders (‘ash carts’) as possible and ensuring that their remaining open top containers are covered using auto-sheeters (see section 8.1.2).

### 8.1.2 Mechanical sheeting devices

There are a range of sheeting devices available commercially for waste containers and vehicles. Some of them are fully automatic, while others are partially mechanised and require some human force to operate them.

We were able to see the first four described here (devices A to D) being operated during a visit to a demonstration of sheeting devices arranged by a waste company. They were demonstrated on three demountable containers: one 40 cubic yard containing green waste; one 40 cubic yard containing general waste; and one 18 cubic yard container containing builders’ rubble. Two other devices, E and F, were seen in use on containers at waste sites.

#### Fully automatic – device A

One fully automatic device was assessed, device A. This was mounted on the chassis of a rollonoff vehicle and was seen in operation on the two 40 cubic yard containers only. It was not demonstrated on the smaller container, as this did not have a flat top, which is necessary for the device to work. The device is operated by a self-contained hydraulic power supply.

Device A consists of three square, linked panels, which are covered with plastic mesh. The container was first loaded onto the vehicle. The device was raised vertically to the correct height for the container, as shown in Figure 26. At this point the panels were vertical. They were then lowered onto the top of the container, so that they were horizontal, and the first panel was in the correct location. The second and third panels were then extended to cover the rest of
the container. The operations were reversed to uncover the load. Figure 27 shows the device covering a container, in a photograph provided by the supplier.

Figure 26
Device A being raised

Figure 27
Device A covering a container
The operating controls for this device are mounted behind the truck cab, so for the whole operation, the driver stood close to the vehicle in a safe position (see Figure 26). It took about 90 seconds to operate, much quicker than manual sheeting. The device costs approximately £5,500 fitted to a new vehicle and slightly more when retro-fitted.

This device completely replaces manual sheeting. All the driver has to do is operate the controls. It is possible that if the container was overloaded, then the device might dislodge something (see the next section). There were no other risks identified.

However, if the container is overfilled or there are projecting objects, then device A will probably not fully contain the load. Figures 28 shows device A on one of the large containers. Although the mesh does conform to a certain extent to the load (the manufacturer states that it can cover “loosely heaped loads”), if the panel does not sit flush on the top of the container, then it is possible that some of the load could be lost in transit. Future developments of this device may solve this problem. On properly filled containers, this would not be a problem.

![Figure 28](image)

**Device A in place on one of the large containers**

**Automatic – device B**

Another automatic sheeting device was examined, device B. Although the sheet was extended automatically, some manual involvement was required to tie the sheet to the vehicle. It was seen mounted on a rollonoff vehicle, and was demonstrated on all three containers.

The sheet is stored rolled up on a mast behind the cab of the vehicle. In addition, there are two rotating arms mounted on the sides of the vehicle, which unroll the sheet and lift it clear of the load. In the demonstration, the container was picked up, then device B was operated from a control panel on the side of the vehicle behind the cab. The device is hydraulically powered.

First, the arms were widened to clear the container. They are designed to sit within the maximum legal width of 2.55 metres. However, they could foul on the container if they were used at this width, so they are moved sideways. This also allows the sheeting device to be used with bulging containers, a problem which is common if containers are loaded by mechanical equipment which pushes the waste hard down inside the container.

The mast was then raised to lift the sheet above the load and the arms were extended to give more clearance over the load. The arms were then rotated to unroll the sheet over the container.
Figures 29 and 30 show device B in operation. When the container was fully covered, the mast was lowered to pull the sheet down over the front of the container. The side arms pulled the sheet down at the back, then the arms were moved sideways to bring them back within the maximum width.

While the driver was unrolling the sheet on the container full of general waste, a door that was projecting out of the top of the container was dislodged and fell to the ground. This was on the other side of the container to the driver, and therefore out of his view. This device was the first to be demonstrated on this container and it is possible that the door could have been dislodged by the other sheeting devices, especially the fully automatic one described above.

On the two large containers, the load was covered reasonably well. However, to ensure that the load was fully enclosed, the driver then used a long pole (similar to a boating hook) to pull down the elastic rope around the sides of the sheet. This was held in place on the sides of the container using long metal hooks. Figure 31 shows the driver pulling the ropes down and
Figure 32 shows it hooked down. Most of this operation was straight-forward, requiring the driver to walk around the vehicle, close to it. The tools were stored in a tray on the side of the vehicle.

![Figure 31](image1.jpg)

**Figure 31**
Driver pulling down ropes on device B

![Figure 32](image2.jpg)

**Figure 32**
Device B in place on one of the large containers

On the small container, the sheet could not be pulled down enough to properly cover the load, because of the top profile of the container and because the arms held the sheet away from the container. This is shown in Figure 33.
To unsheet the containers, the process was reversed. The sheet was first unhooked and then rolled up on the mast. On the container filled with green waste, the elastic rope on the end of the sheet caught on waste projecting from the front of the container. The driver was unaware of this and started to demount the container. He was stopped by someone outside the vehicle, and was able to unhook the rope using the long pole.

Device B took about one minute to operate and about three minutes to tie down. It costs £5,000 to £6,000 when fitted onto a new vehicle. It can be retro-fitted.

This device completely replaces manual sheeting. The driver only had to operate the controls and hook on the ropes. The driver should not need to go on top of the load. However, if the container is badly loaded, then the device could dislodge something, as happened during the demonstration. Poor loading might also encourage the driver to go on top of the load to rearrange it, as for all the other devices seen. We did not identify any other risks.

**Semi-automatic – devices C, D & E**

Two semi-automatic sheeting devices were assessed at the demonstration, devices C and D. They are similar in design to each other, both having sheets mounted on masts on the vehicle behind the cab. Figure 34 shows device C before a container was picked up. These devices most resembled device B, but without the rotating arms.

Both devices were suitable for all three containers and were operated after the container had been picked up. In each case, a rope was attached to the end of the sheet and the mast was then raised, above the top of the container. Figure 35 shows device D after the mast had been raised. The driver then threw the rope over the top of the filled container and unrolled the sheet by pulling from the rear of the vehicle. Figure 36 shows the driver unrolling device C. After the sheet was fully unrolled, the driver tied the rope to the rear of the vehicle. Figure 37 shows the driver tying down device D. He then lowered the mast so that the sheet was in contact with the front of the container.
Figure 34
Device C

Figure 35
Device D after being raised

Figure 36
Driver unrolling device C
For one device, C, the driver found it difficult to throw the rope over the load. He made repeated attempts, most of which failed because the rope did not clear the load. A second driver was successful. The device seen did not have any system for tying down along the sides of the containers, although a similar system as used in device B could be provided as an optional extra. This device was more successful than device B at covering the small container, as it did not have arms holding the sheet away from the container.

The second device, D, had a higher mast which meant that the sheet cleared the load better. The driver threw the sheet over the containers fairly easily, probably because the mast was higher and he was more practised than the other drivers. After tying the sheet down at the far end, he tied down the load by throwing ropes over the container, bringing the sheet down into as much contact as possible with the load. On the small container, this gave complete coverage, although on the larger containers, there was a gap along the edges of the container, because the high load prevented the sheet covering it completely. Figure 38 shows the driver roping down device D on one of the large containers.

To unsheet, both devices were untied, the masts raised and then allowed to roll back up by releasing the end rope. The masts were then lowered.

Both devices were quick to operate, taking about one or two minutes, although this was affected by how quickly the driver could throw the rope over. Device C costs from £2,000 to £3,500 when fitted new and from £3,600 to £4,000 when retrofitted. Device D costs £2,800 as a kit, or £3,600 fitted.

The manufacturer of device C stated that it could be fitted to a bulk waste vehicle.
Both these devices remove the need for the driver to go on top of the vehicle to sheet. However, they may present a new risk in that the driver has to stand at a distance from the rear of the container, facing the vehicle, to pull out the sheet. This is fairly easy to do, but might put the driver in a vulnerable position if there are other vehicles in the area. There would also be a risk of the driver slipping or tripping while pulling out the sheet.

A similar device, E, was seen in operation at a civil amenity site. This was mounted on the arm of a rollonoff vehicle, as shown in Figure 39. It is intended to be used in a similar way to devices C and D, except that it is operated when the container has been lifted at one end but not yet been pulled onto the vehicle. Figure 8 in section 7.1.3 shows the device after the container had been sheeted. However, the driver had not used it before and had not been trained to use it. Instead of sheeting the container from the ground, he climbed into it, as described in section 7.1.3.
**Other mechanised devices – device F**

A different type of device, F, was seen in use at a waste transfer site. Unlike all the other types of device described above, it was fitted to the container, not the vehicle. It consisted of two nets, one attached to the top edge of each side of the container. Each net had a bar running along each end to keep it stiff. The bars in the nets were attached to a shaft that ran the length of the container, which was in turn fixed to a shaft down the side of the container. On the end of this was a handle. Turning this made the sheet lift and rotate on to the top of the container, covering the load. Each panel covered half the load. Figure 40 shows a container with the device open and Figure 41 after it had been operated.

The examples seen of this device, both in use on a container that had been filled by a mechanical shovel and on an empty 50 cubic yard container, were both in fairly poor condition, with bent shafts and ripped nets. However, the one seen in use covered the load well and was quick to operate. Figure 42 shows the device after it had been operated on a full container. It took the driver two attempts to operate it, because the first time that one net was rotated, it stuck on the load. The driver then dropped it back down and the mechanical shovel rearranged the load, moving it so that it would not foul the sheeting device. After this, the driver was able to shut it successfully.

A similar design can apparently be used on bulkers, with four nets, two on each side of the container. However, all these devices can be damaged. The mechanical shovels used to load bulkers and some containers can hit the side of the container during loading and can damage any device that is mounted on the container or on the vehicle. However, this is apparently due to poor technique on the part of the shovel operator and it is possible to load with a shovel without damaging sheeting devices.

Bulkers are similar in design to tipper lorries, and the same kind of sheeting devices that can be used on tippers (as shown in HSG 148) can be fitted to bulkers.

**Advantages**

The most important advantage of all these devices, A – F, is that they remove the need for drivers to go on top of the load to sheet or unsheet it. They are also quicker than manual sheeting. They should not be affected by adverse weather conditions.

Most devices can be retrofitted to existing vehicles or containers, as well as fitted to new containers.

**Disadvantages**

At present, not all of the devices contained the load completely, and therefore may not comply with environmental legislation. Some of the devices did or might dislodge projecting parts of the load (see the risk analysis below). Overfilled containers could affect all of the devices and might cause someone to climb on top to remove some of the load.

Some of the devices could be damaged when used on containers loaded by mechanical shovels, if the loading is not carried out properly. Not all devices could be used on all containers.

**Risk analysis**

The risk analysis carried out for manually sheeting a cardboard container, shown in Table 2, was repeated for sheeting with these devices. The results are given in Table 9.
Figure 40
Device F open

Figure 41
Device F closed

Figure 42
Device F closed on full container

Figure 43
Overhead gantry in waste shed
Table 9
Risk analysis for using a sheeting device

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
<th>Risk level with device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall into load or from height</td>
<td>Very High</td>
<td>None</td>
</tr>
<tr>
<td>Walking on an uneven surface, with voids, slipping and tripping hazards</td>
<td>Fall into load or from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Working at a height of over 2 metres above ground level, often standing, walking or pulling while near the edge of the load and container</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Climbing on and off the container</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Walking in and on dangerous loads, including sharp objects, etc.</td>
<td>Contact with dangerous objects</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while stooped or in other awkward postures</td>
<td>Strain/sprain, cumulative damage</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Dislodging part of load, if badly filled</td>
<td>Falling object</td>
<td>None</td>
<td>Medium</td>
</tr>
<tr>
<td>Pulling out the sheet, standing facing the rear of the vehicle (devices C and D)</td>
<td>Struck by another vehicle</td>
<td>None</td>
<td>Low</td>
</tr>
</tbody>
</table>

Overall, these devices adequately reduce the risks associated with sheeting, by removing the risks associated with working at height on an uneven surface. However, a poorly loaded container may mean that drivers would have to go on top of the load to remove excess waste.

**Potential uses**

Some of these devices have been available since 1993, whereas others are new and still under development. There is clearly a market for these devices, as they can provide a major improvement in health and safety in the industry where sheeting and unsheeting presents the highest risks.

Further development of the devices is required in some cases, and this should reduce or improve some of the difficulties (such as incomplete enclosure of the load) described above.

It is possible to obtain devices to sheet all waste containers and vehicles, new or old. Some waste companies have already fitted mechanical sheeting devices or are trying them out at
present. The exact choice of device will depend on a range of issues, such as the types of containers and vehicles, age of vehicles, etc.

There are still some problems with putting sheeting devices on bulkers, because of potential damage, but this should not justify drivers having to sheet or unsheet without protection, especially as these present the highest risk levels. Careful filling or using an alternative methods of filling bulkers (see section 8.1.5) should reduce the likelihood of damage.

However, even with these devices, overloading is still a problem and may cause drivers to climb onto the load.

### 8.1.3 Overhead gantries

Operators of some waste transfer stations and land fill sites have installed gantries with harnesses for drivers to use when sheeting or unsheeting. A visit was made to a waste transfer station where one has been in use for about four years. An overhead beam had been installed in one of the sheds in which waste is collected, with enough space to allow a bulk waste vehicle to park. One line with a harness was attached to the beam. Figure 43 shows the beam in the shed.

Trimming and sheeting a bulker was described in section 7.1.1. This was assessed then as if the driver had been carrying out this task without any protection. The use of the harness and gantry are detailed here.

Before climbing on the vehicle, the driver picked up the harness from the rear of the shed, where it was clipped to the wall. It was apparently stored here, although it is not clear why, as this was very close to where rubbish was dropped by the public into the shed, as shown in Figure 43. The driver pulled the harness, attached to the gantry, to the front of his vehicle, near its ladder, and put the harness on. He did this easily, but failed to adjust it to fit him, although it was clearly too big for him.

He then wore it while trimming and sheeting the load, as described in 7.1.1. He ignored the harness and gantry throughout the task. After he climbed down off the vehicle, he walked round the front of his vehicle, pulling the harness wire to make sure that it didn’t snag on the vehicle. He then took the harness off and re-attached it to the rear wall.

### Driver acceptability

The driver who used the gantry was interviewed. He felt it was a good idea. He had never fallen from a load, but had slipped a few times. He had not had any specific training to use it. He found the harness uncomfortable and too loose on him.

However, the site operators had had problems with getting drivers to accept the harness. Some drivers were contemptuous of it. They had had some problems of the line getting caught up on the vehicles. There had also not been enough safety checks made on the harness.

### Risk analysis

The risk analysis carried out for manually sheeting a bulker, shown in Table 1, was repeated for sheeting with the gantry. The results are given in Table 10.
### Table 10
Risk analysis for sheeting a bulker using a gantry

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level with gantry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>Low</td>
</tr>
<tr>
<td>Walking on an uneven surface, with voids, slipping and tripping hazards</td>
<td>Fall from height</td>
<td>Low</td>
</tr>
<tr>
<td>Working at a height of about 4 metres above ground level, often standing, bending down, walking or pulling while on the edge of the load and container</td>
<td>Fall from height</td>
<td>Low</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>Low</td>
</tr>
<tr>
<td>Climbing on and off the container</td>
<td>Fall from height</td>
<td>Low</td>
</tr>
<tr>
<td>Walking in and on dangerous loads, including sharp objects, etc.</td>
<td>Contact with dangerous objects</td>
<td>Medium</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while in stooped and/or twisted posture</td>
<td>Strain/sprain, cumulative damage</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Overall, the risks are reduced when sheeting using the gantry. Although there is still some risk from falling when wearing the harness, it is much lower than when it is not being used. Sheetimg under cover also reduces the risks from the weather. It does not affect unsheeting.

### Gantries at landfill sites

At landfill sites, many different vehicles have to be unsheeted before unloading. Unsheeting should be carried out as close to where the vehicle is to be unloaded as possible, to minimise the amount of windblown rubbish. However, the tipping areas move. In order to make a gantry as useful as possible, it needs to be moveable. It also needs to be on stable ground.

One waste company has installed an unsheeting gantry system at a landfill site. This was described at a meeting of the Sheeting and Unsheeting Working Group of the Environmental Services Association that we attended as part of this study.

The gantry is constructed of steel framework and incorporates an inertia reel arrest harness system and access ladder. The vehicle is parked under the gantry, then the ladder is pushed over to the vehicle for access to the load. The gantry can be moved from one area to another, by one of the site vehicles. The site has to be prepared using levelled and compacted hardcore. The gantry has to be inspected by the manufacturer after it is moved.
All drivers are shown how to use the equipment and a full-time supervisor ensures that they wear the harness. It has been in use for six months and is used by the drivers of the site’s customers, “almost without complaint”. Safety checks are carried out on the equipment daily.

The risks associated with the use of this gantry appear to be similar to the one seen on a transfer station. The gantry cost £8,000 to £10,000 and the company who has installed it has decided to install them on all their landfill sites.

**Potential uses**

These systems rely on the drivers using the equipment properly, including adjusting the harness to fit. As with any safety precaution that relies on procedures and personal protective equipment, it cannot be considered to be 100% reliable. However, they are a considerable improvement on manual sheeting without a gantry.

A gantry system does not reduce the risks as much as a good mechanical sheeting system mounted on the vehicle or container. However, there are still many vehicles which have not been fitted with sheeting devices, especially unloading on landfill sites, and gantries are therefore a viable option which can be installed in the short term, at transfer stations and on landfill sites.

8.1.4 Platforms

Platforms have been installed at some waste transfer stations and land fill sites, to provide some protection for drivers. The intention is that the platforms allow access to the sides of the vehicles to be sheeted or unsheeted. However, they do not provide protection against falls. It is also difficult to design them to be suitable for a wide range of vehicles.

One was seen on a transfer station, however it was not possible to see it being used. Two platforms made from scaffolding had been installed in line with where vehicles are loaded, as shown in Figure 44. Vehicles drive in at the other end of the shed and are loaded from above, as described in section 8.1.5.

![Sheeting platform on waste transfer station](image)

**Figure 44**

Sheeting platform on waste transfer station
They are then sheeted while parked in between the two platforms. Each platform can be reached by a ladder. These allow access to each side of the load, for trimming and sheeting. The edge of the platform closest to the vehicle is protected with a guard rail, as for normal scaffolding.

As this was not seen in use, it was not possible to carry out a risk analysis or to talk to any driver who used it.

A different design of platform has been installed on a landfill site. This was described at a meeting of the Sheeting and Unsheeting Working Group of the Environmental Services Association that we attended as part of this study. It is a mobile frame system used for unsheeting a range of different vehicles.

The frames are based on articulated trailers, and there are three in line, providing two drive through stations for unsheeting. The trailers have been built up to different levels to allow for different sizes of vehicles. Barriers have been erected to help guide vehicles in and stanchions have been installed to prevent damage to the frame. The company had to try out a number of different types of foundations before finding one that was adequate.

The frames do not completely prevent drivers from walking on the load when unsheeting. It is difficult to “police” and someone is needed full-time to supervise it. The company that operates the site is trying to educate the drivers who use the site.

Platforms and frames generally do not reduce risks as much as overhead gantries do, however they can provide reasonably safe access to the sides of the vehicle, especially for trimming. They are therefore an improvement over manual sheeting with no protection.

### 8.1.5 Improved loading of bulkers and containers

Bulkers and containers are filled from above at transfer sites with general household and commercial waste in order to move it to landfill sites. A variety of methods can be used for filling. How these vehicles are filled will affect how safe the load is to walk on and how much damage may be done to the vehicle and any sheeting devices that are fitted to it.

Loading with a mechanical shovel is described in section 7.1.1. This requires considerable skill on the part of the shovel operator to pack the load in well and not to cause any damage. An alternative method is to use a hydraulic excavator, which can compact the load down better. A smaller bucket can load the container and tamp down the load well.

An even better system for loading is to position the vehicle below the level where the waste is stored, so that waste can be pushed in by the shovel, directly into the vehicle. This was how bulkers were filled at the transfer site where the scaffolding platform, described in section 8.1.4, was installed. After loading, the driver moved a short distance forward to the sheeting platform.

There are also alternative methods for filling recycling containers at civil amenity sites, other than the system described in section 7.1.2. One or two platforms are provided at some sites. The container is placed either between two platforms or next to a single platform. The platforms are below the lop of the container, and include handrails. The public can then fill the containers from the platforms. This should ensure that the container is more evenly filled. The same platforms can then be used when sheeting the container.

Some civil amenity sites and transfer stations do not have enough space to allow alternative loading methods to be used.
8.1.6 Safe systems of work and PPE

Most of the waste companies that we interviewed during this study are still at least partly relying on drivers following safe systems of work while sheeting and unsheeting. Some of them had written procedures, and we were able to examine two of these. They did not fully described how to sheet waste containers, and we considered that neither of them would adequately control the risks involved.

Some companies are attempting to persuade their customers to stop overloading or badly filling containers. They have instructed their drivers to refuse to pick up loads which are overfilled. Two companies we contacted are trying to educate their customers in the importance of properly filling containers, including explaining that if containers are better packed, then they will save money by requiring fewer collections.

We believe that this is a necessity in the waste and recycling industry. The companies that transport waste are in a position where they can reject unsafe loads. Pressure from the waste transport companies may be the only way of improving how containers are filled.

All drivers seen sheeting were wearing high visibility jackets, safety shoes and overalls. Most also wore gloves and hard hats. Although these are all useful and necessary, none of them are sufficient to give full protection from any of the risks identified in section 7.1.

Two organisations have prepared or are preparing guidance covering the safety of sheeting and unsheeting. These are discussed in Chapter 9.

8.2 FLAT BED VEHICLES

We were unable to find as many solutions for flat bed vehicles as we found for waste vehicles. We believe that this is partly because flat bed vehicles are one of the most versatile designs, as they can be loaded from above as well as from the sides. This means that many of the haulage companies that operate them can work for a wide range of industries, although they do tend to specialise to a certain extent, depending on their location.

In most industries, flat bed vehicles are not the most common vehicle used. This diffuse nature of their use means that it is unlikely for the risks covered by this study to be the focus of any one industry sector. The exception to this is fertiliser manufacturing, where the combination of the high percentage of flat beds still being used and the number of accidents associated with sheeting has brought pressure on at least the larger companies to address the problems.

Unfortunately, unlike in the waste industries, the leading trade bodies that deal with road haulage and the industries where flat beds are used have been less active in finding solutions to these problems. One trade organisation told us that sheeting was not something they were interested in and that we should talk to their members.

8.2.1 Eliminating sheeting or netting

As in the waste industry, some of the risks associated with sheeting flat beds are high enough to justify eliminating the need to sheet. Some examples of this were found in this study and are described below.

Some sheeting or netting is carried out solely to secure the load. In this case, alternative means of securing the load should be considered, as ropes, straps or webbing can frequently be used from the ground.
Some sheeting is solely to keep the load clean and dry, usually to meet customer requirements. More attention needs to be paid in some industries as to whether these requirements can be met in another way (e.g. by shrink wrapping) or whether they are truly necessary. In our opinion, sheeting to meet customers’ aesthetic requirements cannot be justified.

Straw is often not sheeted, because of the time it takes and the risks involved. However, it is a legal requirement to sheet straw to prevent material being lost on the roads.

**Bricks**

In the brick industry, stacks of bricks are netted solely to secure the load. One manufacturer has removed the need to net on their own flat bed vehicles by providing good webbing and strapping which retains the load. They also have low (about 1 metre high) curtain sides. These are primarily for streamlining and advertising, but they also provide some additional load restraint if necessary. In addition, they ensure that the bed of the vehicle is swept before loading to ensure it is free of any dust (particularly brick dust) before it is loaded. If this is done, then the likelihood of the load moving is much lower. If bricks need to kept clean and dry, then they are shrink wrapped.

The same manufacturer is also about to start using a new design of flat bed with a framework on each side which slides down. Apparently this is easier to operate than the low curtain sides.

**Fertiliser**

Fertilisers are sheeted to both secure and to keep the load dry and clean. This appears to be universally accepted by fertiliser manufacturers. However, it would be possible to secure a load of fertiliser by using ropes, webs or straps. High loads of straw or hay can be secured by ropes, and fertiliser bags should be easier to secure. We were told by some manufacturers that ropes would damage the packaging, if this is true then it should be possible to use wider straps, which can be thrown over from the ground.

The main reason for keeping the bags dry is to prevent water ingress which causes problems during use. This occurs because of the design of the bags. A potential long term solution for the fertiliser industry would be find a design of bag which not only adequately contains the fertiliser and can be handled easily but also does not retain water. This would also be attractive to manufacturers as they would not need to sheet the stacks of fertiliser bags which they store outside prior to despatch.

It is not possible to fully evaluate this solution as part of this study. We were not made aware by any of the large fertiliser manufacturers that they were investigating this possibility.

**Palletised goods**

These are most often carried in curtain-sided vehicles rather than on flat beds, but where they are, the need to shrink wrap goods to keep them clean and dry during storage as well as during transit removes the need to sheet. It should be possible to safely secure palletised goods by webbing or roping, as long as the securing method is adequate to both keep the pallet of goods together and to keep it on the vehicle.
Only one mechanical sheeting device for flat bed vehicles was found in this study. One supplier (of one of the mechanical sheeting devices for waste containers that are described in section 8.1.2) is in discussion with the American company for whom they act as dealers about a device that might be suitable for flat beds, but this is not yet available here.

The fertiliser manufacturer who has developed this sheeting device has filed for a patent for it and had published details of the device in a paper presented at a meeting of the International Fertiliser Society (see references in Chapter 12). As a trial, these devices have been fitted to two vehicles belonging to haulage companies who deliver fertiliser. The cost for two devices, including development, was approximately £7,000. The intention is that these devices could be retro-fitted.

The device consists of two arms, one mounted on each side of the flat bed in about the centre of the trailer and linked by a common shaft below the deck of the vehicle. When not in use, they are stored, partly retracted, along the side of the vehicle. Figure 45 shows a double stack of fertiliser bags on the vehicle fitted with the device. One of the arms of the device can be seen below the right half of the trailer. In addition, a sheet support device is fitted to the rear of the trailer. These are two supports which are stored under the deck of the vehicle and are pulled out to support the sheet while it is pulled on or off the load.

Before loading, the driver extended the sheet support device and put the sheet, which was stored on the rear of the deck when not in use, on it. Figure 46 shows the table extended, holding the sheet. After loading with a double stack of fertiliser, the driver pulled the rotating arms a short distance out to release them from where they are stored. He pulled the locking pin out, extended them to their full length and relucked them with the pin. He then rotated the arms so that they were pointing towards the rear of the vehicle.

The driver threw the leading edge of the sheet over the end of the load. This end includes a bar which needs to be on the load before it is pulled over by the arms. This device only works with a lightweight sheet, which is described in more detail in section 8.2.5. The driver did not find it difficult to throw the edge of the sheet up. He then attached one of the ropes on the two front corners of the sheet to each of the arms.

In order to pull the sheet over, the driver ‘walked’ the arms towards the front of the vehicle. By the time they were almost upright, he had to push hard on the base of the arms to drag the weight of the sheet across the load. After the arms had gone past the vertical position, he started pulling them down.

However, after trying hard to pull the sheet over, he realised that something was stopping it. He dropped the arms back to the rear of the vehicle, then checked and found that the sheet had got caught on the last bag on the other side of the load, out of his sight. He freed it, and then repeated rotating the arms and succeeded in rotating the arms fully forward. The leading edge of the sheet was then three rows of bags from the front of the load.

He untied the sheet from the ends of the arms and put the ropes over the front of the load. He was then able to finish pulling the sheet forward while standing behind the cab (below the level of the deck). He then returned the arms and the support device to their storage positions and tied the sheet in as normal.
To unsheet, he untied the sheet then extended the support device. He was then able to pull the sheet off the load from the rear of the vehicle, and fold it on the support device. After unloading, the sheet would be stored on the bed of the vehicle again and the support device pushed back in.

**Advantages**
The most important advantage of this device is that it removes any need for the driver to go on to the bed or onto the load during sheeting and unsheeting. The arms were long enough to clear the top of the second layer of bags and to pull the sheet near enough to the front of the load so that the driver could pull it the rest of the way.

**Disadvantages**
At present, this device has a number of problems which makes it difficult to use. The drivers who had used it on the vehicle, the driver who demonstrated it and two other drivers who tried
it during our visit all found pulling the arms over hard work. The contractor who owned the vehicle that is was mounted on stated “one driver hurt his back and another driver found it hard to operate”. Rotating the arms would be defined as manual handling and would require an assessment under the Manual Handling Operations Regulations 1992.

The contractor also said that when it was wet and windy, the sheet was even harder to pull over. He said that dirt from roads and farms made it more difficult to pull the arms in and out of their stored position. He had been told by his garage that the device did not conform to the requirements of the MOT, although it is not clear why.

**Risk analysis**

The risk analysis carried out for manually sheeting fertiliser, shown in Table 4, was repeated for sheeting with the device. The results are given in Table 11.

**Table 11**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
<th>Risk level with device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Walking on an uneven surface</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Working at a height of about 2.3 metres above ground level</td>
<td>Fall from height</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Jumping down from the load to a low part of the vehicle and then onto</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while in stooped</td>
<td>Strain or sprain, and cumulative</td>
<td>Medium</td>
<td>High (pulling arms of device)</td>
</tr>
<tr>
<td>Pulling out the corners of the sheet while leaning backwards</td>
<td>Fall backwards if straps fail or lose hold</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Overall, the mechanical device reduces the risks associated with sheeting, by removing the risks associated with working at height on an uneven surface. However, there is an increased risk due to manual handling. The support table removes the risks when unsheeting almost completely.

**Potential uses**

Although the device has problems in its present state, it clearly has potential, both in the fertiliser industry and elsewhere. If the problems can be removed, then we believe it represents
the best option where sheeting cannot be eliminated, as it removes the need for drivers to work on the top of loads or on the deck.

The simplest part of the device is the support table used to hold the sheet during sheeting and unsheeting. This could be used by itself for unsheeting, even if the rest of the device is not fitted. This would remove the need to go onto the load when the fertiliser is unloaded.

It should be possible to mechanise the device so that the arms do not have to be rotated manually. This was the main problem encountered by the drivers who had used it. This may also be enough to overcome the ‘sail’ effect caused by wind. Improvements to the design should also be able to overcome the problem of the ingress of dirt.

It may also be possible to make a floor mounted version that could be installed where the vehicles are loaded, rather than on the vehicles themselves. This was a suggestion made to us by a HSE Inspector. The arms could be sufficiently far apart to allow the vehicle to park in between them. The sheet could be attached to the arms, possibly to a bar across between the ends of the arms. The device would need to be mechanised to overcome the manual handling problems encountered with the original device. However, this would get round the problem of all vehicles being fitted with the device, although a sheet support table would still be required, to hold the sheet and for unsheeting.

We anticipate that this may have applications in other industries which use flat beds for loads that are fairly uniform in shape and which would not snag the sheet during unsheeting. For instance, some products such as steel, timber, etc., might be sheeted with a device based on this design. However, it does not appear to be suitable for flat bed vehicles which have a crane mounted on them.

We believe that this device needs to be further developed, probably by a company who is already manufacturing sheeting devices, to evaluate its potential. If successful, it could be both retrofitted to existing vehicles and fitted to new ones.

While we were examining this device, the drivers involved discussed ideas they had for alternative sheeting devices. One of them had already been thinking about this and had sketched out a device. Although none of the possibilities that they discussed were far enough advanced for manufacture, this illustrated that there is potential for developing sheeting devices for flat bed vehicles.

8.2.3 Overhead gantries

During this study, one large fertiliser manufacturer installed overhead gantries for their contract haulage companies to use. They had been made aware by the HSE that they should consider the back of contractors’ vehicles to be ‘shared’ workplaces, with both the fertiliser manufacturer and the haulage company having responsibilities to ensure the safety of the drivers. The fertiliser manufacturer has control over the design of the bags, the loading and the site where the vehicles are loading, all of which influence the risks associated with sheeting. In the past, the manufacturer had sent out guidance to their hauliers, however a local HSE inspector had decided that this was not sufficient.

The manufacturer had decided that the only way they could prevent falls during sheeting was to provide gantries under cover and insist that drivers used them. They also decided that they should provide the training required to make sure all their hauliers (who have to be registered) had been trained.
In one of the storage sheds, two lines containing four beams each and four access platforms had been installed. These provide a total of eight sheeting stations, as each platform is double sided, giving access to two beams. The sheeting platforms are arranged in a ‘drive through’ layout, so that the vehicles can drive to the furthest free station, then drive out the other end after sheeting. Figure 47 shows the empty sheeting area, with one of the platforms visible between the second and third pillars from the right. Figure 48 shows three vehicles in the area, after sheeting.

It is therefore possible for eight flat bed lorries to be sheeted at the same time. If this is not enough in the season, then it is anticipated that the drivers could sheet as far as tying down the four corners of the sheet while at the sheeting station, then drive outside to finish tying down.
This installation had cost approximately £80,000 to install in an existing structure. They had considered installing gantries around the site but considered it more practicable to place them together under shelter, although this meant that the vehicles had to drive there (a maximum of half a mile) from where they were loaded with the load unsecured.

The harnesses were inspected visually once a week and fully checked to comply with statutory requirements.

The drivers we observed using this system first placed the sheet on top of the load, while standing behind the cab. They then walked up the steps to the platform and put on the full body harness, which is linked to the beam by an inertia reel system that operates if the driver falls. This is kept clipped to the guard rail of the platform when not in use. A display on the platform shows how the harnesses should be worn, including photographs.

One of the drivers found it very difficult to put the harness on. After about five minutes of trying to and failing, he looked at the instructions and then did it correctly. The other drivers put their harnesses on easily.

The harness platform incorporates a drop down section which could be easily lowered onto the top of the load, providing the vehicle was parked correctly. Two out of the four drivers seen using the system parked too far away from the platform so that they had to step across a small gap from the drop down section to the top of the load. However, they were tied on at this point.

Once on top of the load, the sheeting was carried out as for manual sheeting without a harness, as described and shown (in Figures 11 to 14) in section 7.2.1. After laying out the sheet, the drivers returned to the platform, pulled up the drop down section, then took off the harness and re-clipped it to the platform rail. The rest of the sheeting process was then as usual.

**Interviews with drivers**

Four of the drivers who used this equipment were interviewed. One was unhappy with it and would have preferred not to use it as he did not like the feeling of being ‘tied up’ (despite having once fallen off a 16ft stack of straw on the back of a flat bed, breaking his wrist). While using it, he had repeatedly pulled the wire behind him when walking on the load. None of the other drivers had needed to do this. He had not been shown how to use the harness properly (this was the driver who had had problems putting it on).

Another driver did not like using it and felt it was quicker and easier to sheet without the gantry. He felt that the platform was too far away from the vehicle and he had had to lean across to pull done the drop down section after sheeting. Figure 14 in section 7.2.1 shows the gap between the vehicle and the platform. He thought that there should be guidelines on the floor to show where to park. (The distance is determined by the driver, who in this case could have parked closer, as other drivers did). He also pointed out that there was no gantry at the other end when unsheeting. However, he said that he had no option other than to use the gantry. He had not been trained in how to use the harness.

The third driver had been shown how to use the equipment and was finding it easier to use. He was most pleased that it was under cover, and gave protection from the wind, as sheeting was “hard work outside in winter”. He felt that the equipment was “OK”.

The fourth driver felt that it was a good idea and was happy to use the harness. He had been shown how to use it. He had never fallen off, but was careful when sheeting without a gantry and always unsheeted from the ground.
The risk analysis carried out for manually sheeting fertiliser, shown in Table 4, was repeated for sheeting with the gantry. The results are given in Table 12.

**Table 12**  
Risk analysis for sheeting fertiliser, using a gantry

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
<th>Risk level with gantry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain or ice making the top of the load more slippery</td>
<td>Fall from height</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Walking on an uneven surface</td>
<td>Fall from height</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Working at a height of about 2.3 metres above ground level</td>
<td>Fall from height</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Wind catching the sheet and acting as a sail</td>
<td>Fall from height</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Jumping down from the load to a low part of the vehicle and then onto the ground</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Manually handling the sheet into position, often while in stooped and/or twisted posture</td>
<td>Strain or sprain, and cumulative damage</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Pulling out the corners of the sheet while leaning backwards</td>
<td>Fall backwards if straps fail or lose hold</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Overall, the risks are reduced when sheeting using the gantry. Although there is still some risk from falling when wearing the harness, it is much lower than when it is not being used. Sheet ing under cover also reduces the risks from the weather. A clay extraction company that was interviewed during this study has also installed gantries where flat beds are frequently sheeted. However, they are not always under cover and there is resistance from the drivers to using them. The drivers have requested cover to protect them from the wind and rain when sheeting.

The company who have installed the gantries at present only allow single stacking of fertiliser bags, as they consider double stacking too dangerous. However, the gantries could also be used for double stacked loads. It is envisaged that it would reduce the risks from sheeting a double stack, although a full assessment would need to be carried out. Double stacking may also increase the risks during unsheeting, although this depends on how the driver unsheets the load.

**Potential uses**
The gantries have only recently started being used. Although there is clearly some resistance from drivers to using it, they are doing so as the fertiliser manufacturer is insisting on it being used. We would expect drivers to accept it more after they have used it for some time.
This system relies on the drivers using the equipment properly, including adjusting the harness to fit. As with any safety precaution that relies on procedures and personal protective equipment, it cannot be considered to be 100% reliable. However, it is a considerable improvement on manual sheeting without a gantry.

As one large fertiliser manufacturer has installed this system, if it proves to be effective it might be considered reasonably practicable for other manufacturers to do the same.

One criticism of the gantry system is that it only provides protection during sheeting, not unsheeting. However, this at least halves the risks the drivers take. If vehicles could be fitted with the support tables described in section 8.2.2, then drivers would not need to climb on the load during unsheeting.

This system does not reduce the risks as much as a good mechanical sheeting system mounted on the vehicle, however it is currently available and therefore should be considered.

It could also be used in other industries where loads have to be sheeted on flat beds, as long as there is nothing that the line could snag on. For instance, a crane mounted on flat bed for loading and unloading brick stacks might be a problem. However, we have been unable to find anyone who had tried this out.

8.2.4 Platforms

The HSE has published some guidance on the sheeting and unsheeting of loads, in HSG 136 “Workplace Transport Safety”. This states that “where sheeting is done frequently it may be reasonably practicable to provide platforms from which loads can be sheeted without the need to climb on the vehicle or load”. The guidance does not define ‘frequently’. This guidance may be in conflict with the Approved Code of Practice for the Workplace (Health, Safety and Welfare) Regulations 1992, which says where reasonably practicable, gantries should be provided. This is discussed further in section 9.1.

A port authority that we interviewed for this study has decided to provide platforms where flat beds are frequently sheeted at the port. They believe that the safety of the drivers when sheeting is solely a matter for the driver’s employers. However, they have decided to provide platforms where flat beds are frequently sheeted, following discussions with the HSE. They are concerned about what will happen if drivers prefer not to use the platforms and what the legal position would be if a driver fell off the platform.

They have decided to encourage drivers to use the platform. They may make them compulsory in the future.

The platforms will cost £11,000. They were being built during this study. They will be level with the bed of the vehicle, with steps at each end. The design is based on the HSE guidance “Sheeting and Unsheeting of Tipper Lorries”, HSG 148.

The fertiliser manufacturer who has installed gantries (see section 8.2.3) had decided not to install platforms, as they felt that it was impossible to achieve the right width for flat bed vehicles. They also believed that they would get hit by the vehicles.

The brick manufacturer that we visited had installed platforms at one site, however they were not being used. We were unable to find out why they were not in use.
Platforms do not prevent falls, however they do provide safe access along the sides of vehicles. They should be safer than sheeting without any safety precautions, but they will only reduce some of the risks identified in section 7.2. We were unable to carry out a risk analysis of using platforms to sheet flat bed vehicles, as we were unable to see any in operation.

8.2.5 Lightweight sheets

The sheeting device developed by a fertiliser manufacturer which is described in section 8.2.2 was used with a lightweight sheet. This was a close weave sheet, with a much smaller mesh size than the nets used to secure bricks. They weigh 14 to 22 kg compared to 40 to 50 kg for a conventional sheet. Figure 46 in section 8.2.2 shows a lightweight sheet.

The fertiliser manufacturer first tried out the sheets without the sheeting device. They were used by the drivers to sheet during loading. The method used is described in section 7.2.1, under Other risk factors. It involves drivers standing on the bed of the vehicle and sheeting each fork lift truck load of six fertiliser bags as soon as it was loaded, while the truck is picking up the next load.

With the lightweight sheet, the drivers pulled them over the load with ropes. This means that the load can be sheeted from the bed of the vehicle, removing the need to climb on top of the load. However, this method increases the risk to the driver from being struck by the fork lift truck.

The drivers who tried this method felt that it could be improved by using a vehicle mounted sheeting device, so the fertiliser manufacturer went on to develop the device described in section 8.2.2.

The lightweight sheet itself is not waterproof, however, the driver that we interviewed who had used it found it preferable to conventional sheets. He said that it kept the load clean and dry, and if the bags are wet when loaded, the air that blows through it while in transit helps dry the bags out. He had found that rain only weeps through.

His views were supported by the views of the drivers who had tried it out in the trial, as reported in a paper presented to the International Fertiliser Society (see Chapter 12).

They found the sheet better in the wind, as air could pass through the sheet, and that it was easy to roll up on farms as they unloaded.

This sheet appears to reduce the risks when sheeting fertiliser bags. If it is used in conjunction with the support table, which is described in section 8.2.2, then it can remove the need to climb on the vehicle or load during unsheeting.

Although this sheet by itself does not remove the need to climb on top of the load during sheeting, it should reduce the risks from the manual handling of the sheet, and the effects of wind and rain.

Potential uses

This example illustrates that sheets do not have to be completely waterproof even if the intention is to keep the load dry. There is clearly scope for experimenting with different types of sheets.

We believe that it is possible that any industry that is still using traditional heavy tarpaulins should experiment with other materials to ensure that they are using the best type, which minimises risks while still protecting the load.
8.2.6 Sheltered sheeting areas

The most frequent wish of the drivers who we interviewed that operate flat bed vehicles is to be able to sheet under cover. This would make manual sheeting safer by removing most of the effects of wind and rain, although it would still be possible for the load to get wet while moving between the loading location and the sheeting area.

The fertiliser manufacturer who had installed gantries had placed them in a storage shed as they had always allowed drivers to sheet under cover. However, they lost about 3000 tonnes of storage space when they installed the gantries. Building a new structure would have been much more expensive, costing £250,000 to £300,000. They prefer to store fertiliser under shelter, as they sheet stacks stored outside to keep them dry. This involves risks to the people sheeting the stacks.

We believe that if there is sufficient space available on any site where flat bed vehicles are sheeted, then drivers should be allowed to sheet under cover, to try to reduce risks. However, shelter is not sufficient by itself to adequately control the risks.

8.2.7 Safe systems of work

The majority of companies operating or loading flat bed vehicles that we contacted for this study relied on the drivers following safe systems of work.

The Fertiliser Manufacturers’ Association has drafted guidance for the sheeting of flat bed vehicles (and curtain-sided vehicles). This is discussed in Chapter 9. Although this was only in draft form, awaiting comments from the HSE, one of the fertiliser manufacturers that we visited had started issuing it to their haulage contractors.

The method that it recommends for manual sheeting is based on the HSE guidance published in HSG 136 “Workplace Transport Safety”, which is very similar to the example of a system of work for manual vehicle sheeting and unsheeting contained in HSG 148, “Sheeting and Unsheeting of Tipper Lorries”.

The fertiliser manufacturer has required their hauliers to comply with this method. We interviewed two owners of haulage companies who had issued it to all of their drivers. They felt that the method was based on the terminology for tippers and it did not apply to flat bed or curtain-sided vehicles. For instance, it states that the “sheet should be suitably folded…on a sheet rack or purpose-built shelf or on carrier hooks”. One haulier did have sheet racks on his vehicles, while the other one did not, as he felt it was easier to lift the sheets on to the top of the bags from the bed of the trailer.

One of the owners was concerned about requiring his drivers to sign to say they would follow the guidance, when they would not be able to comply with it.

Our full comments on this guidance are presented in Chapter 9, however we believe that it is not adequate to sufficiently reduce the risks identified in section 7.2.1. It has not been tailored to sheeting fertiliser bags. For example, it is not possible to comply with the guidance when sheeting a double stack of fertiliser bags, as it states that the driver should walk down the centre of the load. It also does not cover other issues such as tying down one end of the sheet in windy conditions before unfolding the rest of the sheet.

However, additional requirements have been included in the guidance, covering routine inspections of equipment. Examples of record cards are included in the guidance, requiring
sheets, ropes and/straps to be inspected before use and by a competent person, other than the user, at least every three months. These inspections should be recorded on two types of record cards.

The two haulage company owners interviewed had both established systems for the inspection of sheets, ropes and/or straps, and one of them had combined this with their defect reporting system. We believe that this part of the guidance is suitable to reduce the risk of a rope or strap snapping when in use, if it is followed and enforced. However, it had only just been started when we visited the fertiliser manufacturer. They are intending to monitor this system, and it is not yet possible to assess its effectiveness. This system could be used in all industries.

One of the concrete manufacturers interviewed was also able to provide copies of their safe systems of work. This covered the netting and sheeting of loads on flat bed vehicles with and without vehicle mounted cranes. The systems appear to be thorough, covering not only the risk of falling from the top of the load, but also access to the vehicle, the use of additional restraint, checking the load security during transit, etc.

However, it still has to rely on telling drivers to take “extreme caution”, for instance in wet or icy conditions, and if is not possible to walk down the centre of the load. Although this appears to be a well-written system, we doubt that it is sufficient to minimise the risks by itself and further controls may be considered reasonably practicable.

This was the best written work system that we saw. Others were briefer and similar to the published HSE guidance.

Two companies interviewed in this study stated that it was possible for two people to sheet flat beds from the ground. Unfortunately, we were unable to find out how this could be done in practice.

One of the brick manufacturers interviewed stressed the importance of keeping the bed of the trailer clean, in order to minimise the risk of brick stacks moving in transit. They sweep the beds before loading to ensure that there is no dust under the bricks which would make them more liable to move. They also use vehicles with air suspension to give a smoother ride, which also reduces the risk of the load shifting.

Another brick manufacturer was drafting a safe system of work when we visited them. However, it covered only some of the risks. It specified some requirements for the fork lift truck driver and the vehicle driver, covering the interaction between them. It did not specify how the drivers should net the loads, as the brick manufacturer felt that they should only point out what the hazards are and let the drivers make up their own minds as to how they deal with them.

Safe systems of work that seek to minimise the risks to drivers from fork lift trucks and/or the prevention of drivers moving their vehicles while they are still being loaded or unloaded are discussed in sections 8.3.3 and 8.3.4, as the solutions discussed for curtain-sided vehicles can also apply to flat beds.

**8.3 CURTAIN-SIDED VEHICLES**

We found more solutions for curtain-sided vehicles than we did for flat beds. Curtain-siders are more widely used, especially by the larger manufacturing and haulage companies. They are less versatile, however they do allow fast access to the entire length of each side of the vehicles.
and to the rear. This makes them popular for transporting loads on pallets and other loads that can be moved by fork lift trucks. One supplier described them as “the biggest part of the market”.

Although the leading trade bodies that deal with road haulage do not appear to have been actively looking for solutions to the risks associated with the use of curtain-sided vehicles, many companies have.

### 8.3.1 Future Big Dray (FBD)

We visited the brewery mentioned in section 6.7 that has designed and developed its own vehicles. We were able to see their latest design, the Future Big Dray (FBD), which they anticipate taking over from their present ‘gull wing’ design (described in section 6.7). One FBD costs about £85,000.

This vehicle is used for secondary delivery, taking loads to pubs, clubs, etc. It is intended to be operated by one or two people, and was designed in order both to improve safety (mainly by reducing the need to manually handle the load), and to improve efficiency. This vehicle does not use curtains. However, it is possible to open the sides of the vehicle fully, so that the whole length can be accessed.

We are unable to include any photographs of the FBD in this report as they do not allow cameras on their sites, although we were able to see one being operated.

Each side of the vehicle has two large opening panels, which are hydraulically operated. When operated, the top panel slid up and tilted over the top of the vehicle to open over half of the side. The bottom panel is a lift platform. When opened, it dropped down until it was horizontal, and level with the bed of the vehicle. At this point, a small flag was hung over the short edge of the platform to make sure that it was more visible to people in area. The platform was then lowered to the ground.

To unload the vehicle, the side platform was tilted so that the outer edge was slightly higher than the inside edge. The driver then climbed onto the platform, and raised it until it was level with the bed of the vehicle. He moved the kegs and goods that were to be delivered onto the platform, which he then lowered to ground level. With the platform still tilted, he removed goods other than kegs, using a sack truck. He then tilted the platform so that the outer edge was touching the ground, so that he could roll off the kegs. The panels were then closed.

The side platforms could also be raised to level with the second pallet, in order to reduce the need for the driver to stretch when unloading.

The main controls are located in the cab of the vehicle. These allow the driver to select which part he wishes to operate, and then to remove the master key so that other parts cannot be operated at the same time. There are also local controls outside the rear of the cab, so that the driver can open the panels while standing by the cab, clear of the danger zone.

There are also controls that can be operated while standing on the side platform. Two footprints have been included in the side platform to indicate where the driver stands while operating these controls. Hazardous areas of the equipment have been highlighted in orange, including the edge of the platform, the trapping hazards along the ends of the vehicle and the top edge of the vehicle.

The vehicle also includes load restraints, which are described in section 8.3.2.
This vehicle relies on people being properly trained to operate it. The company has established a comprehensive training programme specifically for these vehicles and they allow only trained people to operate them. Drivers have to follow a safe system of work while operating it. For instance, the company requires drivers to walk between the load on the platform and the vehicle, rather than down the edge of the platform, to reduce the risk of falling.

**Risk analysis**
The risk analyses carried out for the use of curtain-sided vehicles, (see sections 7.3.1 and 7.3.2) were repeated for the FBD.

The FBD has reduced the risks from manual handling when making deliveries. It also removes some of the risks identified in sections 7.3.1 and 7.3.2. For instance, it almost completely removes the risk of the driver being hit by something falling off the vehicle when it is opened, as the side platform first slowly drops until it is horizontal. If there were anything leaning against this, the driver should be able to stop the platform and retain the load.

However, there is a risk of falling off the platform. This is shown in Table 13, along with the other risks that have been affected. The rest of the risks in Tables 6 and 8 would be unchanged.

This is not a full risk assessment of the use of the FBD, as we would not be able to carry one out without a more detailed examination of how it is operated.

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
<th>Risk level on FBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load shifting during transit and leaning against the curtain</td>
<td>Load falling when curtain is opened</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Falling off bed of the vehicle, or side platform while loading or operating it</td>
<td>Falling a short distance</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Climbing on and off the vehicle, including possibly jumping down to the floor</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Curtains flicking out kegs</td>
<td>Struck by falling object</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Pole sticking and releasing suddenly</td>
<td>Struck by pole</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Wind blowing the curtain while it is being opened</td>
<td>Struck by curtain, pole or buckle</td>
<td>Low to medium</td>
<td>None</td>
</tr>
<tr>
<td>Pulling strap on curtain with one hand, while leaning backwards</td>
<td>Fall backwards if strap fails or lose hold</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>Curtain jamming when being opened or closed</td>
<td>Fall backwards if curtain frees or if driver slips</td>
<td>Low</td>
<td>None</td>
</tr>
</tbody>
</table>
**Potential uses**

We believe that the FBD offers improvements over the use of conventional small curtain-sided vehicles for secondary distribution. This may be useful to the distribution of other goods, such as food and soft drinks, etc., that are delivered to small outlets, such as shops.

The company that has developed this vehicle has now publicised it and it is available to other users. As well as improving health and safety, they have found that the whole life costs of the vehicle are better.

In addition, the FBD is fitted with a closed circuit television camera that shows the driver what is behind the vehicle while it is being reversed. Although this is not part of this study, this improves other aspects of the vehicle safety. This costs about £350 and could be fitted to other vehicles.

**8.3.2 Load restraints**

One of the biggest risks associated with the use of curtain-sided vehicles is of the load shifting during transit and falling out when the curtain is opened. Companies in two industries where this has been identified as a major problem have both found solutions to reduce the risk. Alternative designs of curtains may also be beneficial.

**Paper and board**

Two of the paper companies that we interviewed for this study were able to describe strapping systems that they feel can safely restrain loads, if used properly.

One company had added extra material to standard webbing, which is 2.5 to 3 inches wide. They have found that by increasing the width of the webs to 6 inches, this improved how the loads were restrained. However, as this was then non-standard equipment, they found that hauliers were reluctant to fit them. They also tried air bags between the pallets of paper, which were promising, however the bags leaked.

They now recommend standard equipment that all hauliers can fit. They use the same load restraining straps for pallets and reels. Straps are attached to a pole along the top of the vehicle. These hang down diagonally to the bottom. Each pallet or reel has a strap wrapped around it that holds it forward. These are also used for waste bales. However, the company is still investigating how to restrain loads, in order to improve it further.

Another company not only straps the load, but also cross straps it at the rear of the load to secure it as a unit. They have had an accident where the load was strapped but not cross strapped, and a bale slipped between the straps and fell through the curtain when the driver loosened it. They now believe that cross strapping is a necessity.

The Motor Industry Research Association (MIRA) has carried out some research into restraining loads of paper.

**Breweries**

One of the brewing companies that we interviewed for this study uses an inner layer of netting to help restrain the load if it shifts. Inside the curtains, 80% of their vehicles have a second layer, called an independent cargo control net. If the load shifts in transit, this inner layer should hold it when the outer curtain is opened. The load is visible through the netting, so it allows the driver to rectify any problems before the netting is opened.
The drivers of the vehicles with this system were reluctant to use it at first. However, after a load had shifted and had been restrained by the netting, they were happy to use it.

Suppliers of this inner netting told us that it was popular in the brewing trade, and that it was also suitable for paper. On a new vehicle, one costs roughly the same as a curtain, about £200 - £500, depending on the size of the curtain. They can be retro-fitted, however this can be more expensive.

The company that has developed the FBD (see section 8.3.1) uses a restraining system on it that includes both straps and sheets (or ‘kites’). There are two long centre straps that run along the length of the vehicle, and are tensioned on the rear centre pillar. The kites are located at the end of each of the two compartments. In use, they prevent rearward movement of the load. They are connected to the roof and are pulled around the rear of the load. One corner of the kite is hooked into an appropriate hole in the rave on the edge of the trailer and tensioned.

This company is continuously developing new systems and is currently working on alternative devices to restrain loads.

**Other industries**

One soft drink manufacturer that we interviewed uses special vehicles for deliveries to shops. They are delivering bottles in crates, which interlock to build into blocks. The vehicles have decks that are slightly V-shaped, so that the loads lean towards the middle. The slope is only a couple of degrees but this is enough to retain the load, without any straps etc.

Similar systems are used on some tilt trailers used for transporting steel coils, as described in section 6.5. Some continental vehicles used for transporting paper reels apparently have shaped beds in order to retain the load, however there is some resistance to using these in the UK, as haulage companies prefer to have vehicles that can be used for many different loads.

**Curtain designs**

An alternative solution could be to allow the load to be seen through the main curtain, before it is opened. One curtain supplier informed us that they had produced curtains which incorporated sections of netting. This was to keep the load cool, by providing an air flow through the curtain. This would also allow the load to be seen before the curtains were opened.

Another possibility would be to include transparent sections in the curtain, again to make the load visible. One curtain supplier said that this would be feasible, but they had never done it. A second supplier felt that it might compromise the strength of the curtain, and also increase the risk of theft.

**Potential uses**

There are clearly many different restraint systems available for curtain-sided vehicles. Although some loads are more difficult to restrain than others, there appear to be practical ways in which all loads can be restrained.

This was supported by equipment suppliers, who can provide a wide range of restraint systems, more than we have described here. The accident data examined for this study suggest that where loads have shifted in transit and fallen out when the curtain opens, this has been either because the wrong system has been used or the system has not been used properly, rather than because restraining systems have failed.
8.3.3 Vehicle restraints

The highest risks associated with the general use of curtain-sided vehicles is the interaction between the driver of the vehicle and the fork lift truck loading or unloading the vehicle. This can cause two different problems: where the driver has been in the area or on the vehicle during loading or unloading and has been struck by the fork lift truck or the load; and where the driver has moved the vehicle while the fork lift truck driver has still been loading or unloading.

One soft drinks company that we interviewed and visited felt that the communication between the driver and the fork lift truck driver was the most important issue, and that control of the driver in the loading or unloading area was critical. On one site, they had had an accident when a driver had pulled away when he thought loading was finished. However, the forks of the lift truck were still inside the vehicle and the truck overturned. The driver was unhurt, but the site decided to review its procedures.

At the time of the accident, drivers used to undo the curtain on the second side of the vehicle while the fork lift truck was working on the other side. They changed the system to ensure that drivers were not in the area while the fork lift truck was operating. The safe operating systems that they introduced are described in the next section, 8.3.4.

In addition to safe working practices, they brought in large moveable signs as a short term measure to ensure that drivers would not leave while the fork lift truck was operating. The signs are mounted on pallets which are placed by the fork lift truck in front of the vehicle after it is parked in a loading bay. The stop sign is on two posts so that it is positioned in front of the driver’s windscreen. The signs also ask the drivers to stay inside their cabs. One of the signs is shown in Figure 49.

Figure 49
Stop sign
The signs were found to be effective in preventing drivers leaving too early, however they extended the loading time, and relied on the fork lift truck driver remembering to place it. As a long term solution, they have installed a vehicle restraint system that physically prevents the vehicle leaving until the fork lift truck driver had finished.

The restraint system is based on one commonly used for rigid sided vehicles that are loaded from the rear. It includes a floor mounted device that locks the rear of the vehicle moving. It costs about £5,000 per bay for the locking device with the gate, or about £3,000 if it was interlocked with an existing door. The company who has installed it has 12 loading bays and intends to install it at other sites where it is suitable.

We saw this in operation during our visit. The fork lift truck driver called the vehicle driver when he was ready to load. The traffic lights on the bay were then set to green. The driver reversed his vehicle into the bay, lining the trailer up in the marked area. As soon as the rear of the vehicle touched the upright sensor on the device, the lights changed to red and the driver knew to stop. The sensor on the device is shown in Figure 50, and the traffic lights and layout of the bay in Figure 51.

![Figure 50](image1.png)

**Figure 50**
Sensor on vehicle restraint device

![Figure 51](image2.png)

**Figure 51**
Traffic lights and loading bay
The fork lift truck driver then raised the lock on the device using the control panel mounted just inside the door into the warehouse. Figure 52 shows the restraint in the raised position. This released the interlock on the gate to the warehouse, shown in Figure 53. The fork lift truck driver then opened the gate and started to load the vehicle. While the gate is open, the lock on the device cannot be operated.

During loading, the driver of the vehicle stayed in the cab of the vehicle. If he was needed to move the centre poles, then the fork lift truck driver would call him from his cab to do this, and suspend loading while he does it.

At the end of loading, the fork lift truck returned to the warehouse and lowered the gate. This then allowed him to release the locking device on the vehicle. The traffic lights changed back to green and the driver moved his vehicle.
This vehicle restraint system prevents vehicles being moved during loading. It is under the control of the fork lift truck driver. It would be possible to interfere with the controls, as the driver could access them, however this would have to be intentional.

**Risk analysis**

The risk analysis carried out for the general use of curtain-sided vehicles, shown in Table 6, was repeated for the use of this device. The results are given in Table 14.

### Table 14

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Possible outcome</th>
<th>Risk level</th>
<th>Risk level with locking device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in the same area as operating fork lift trucks, often behind them and often walking backwards</td>
<td>Struck by fork lift truck or load</td>
<td>Medium to high</td>
<td>Low</td>
</tr>
<tr>
<td>Driver moving vehicle while fork lift truck still loading or unloading</td>
<td>Fork lift truck overturning</td>
<td>Medium to high</td>
<td>None</td>
</tr>
<tr>
<td>Talking to the fork lift truck driver while loading vehicle, which could distract the fork lift truck driver</td>
<td>Struck by fork lift truck or load dropped</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Falling off the bed of the vehicle</td>
<td>Falling a short distance</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Climbing on and off the vehicle, including possibly jumping down to the floor</td>
<td>Falling a short distance or jarring</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Pole sticking and releasing suddenly</td>
<td>Struck by pole</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Wind blowing the curtain while it is being opened</td>
<td>Struck by curtain, pole or buckle</td>
<td>Low to medium</td>
<td>Low to medium</td>
</tr>
<tr>
<td>Pulling strap on curtain with one hand, while leaning backwards</td>
<td>Fall backwards if strap fails or lose hold</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Curtain jamming when being opened or closed</td>
<td>Fall backwards if curtain frees or if driver slips</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

The risks associated with the loading and unloading of vehicles are substantially reduced with this device in operation. The safe system of work that the company has also put into place, which is described in the next section, 8.3.4, has been included in this analysis, as it is necessary to make the device really effective.
Potential uses
Both the stop sign and the locking device could be used in any industry where there is a risk of drivers moving their vehicles while the fork lift truck is still operating. They could also be used for other vehicles, such as flat beds.

8.3.4 Other systems to control the interaction between drivers and fork lift trucks
We found a number of different safe systems of work that companies had developed to try to prevent the driver of the vehicle being struck by the fork lift truck or the load, and/or the driver pulling away during loading or unloading. We have briefly described them here, with comments on how effective we believe they are.

One of the simplest systems was multi-skilling. In a soft drinks company, the drivers of the secondary delivery vehicles loaded their own vehicles. Although this company uses contractors for their primary distribution, they own and operate the small vehicles they use for deliveries to small shops, pubs, etc. Each day, the drivers of these vehicles pick the load for the next day’s deliveries. They then load them onto their own vehicle, arranging them as needed for the deliveries. Their vehicle is then ready for them to make the deliveries the next morning.

This system removes the risks from poor interaction between the two drivers. However, it is likely to be only useful in secondary distribution.

The same company operates a different system for the primary distribution. They had had an accident in the past where a driver had pulled away while the fork lift truck was still operating. They now insist on the driver locking the vehicle, then hanging the keys on a board with hooks, one for each bay. The fork lift truck driver does not load or unload the vehicle unless the keys are on the hook. During unloading, the drivers return to their vehicles and oversees the loading or unloading.

This system should reduce the risk of the driver pulling away early. However, other companies who have operated similar systems have found that the drivers will sometimes have two sets of keys. It is therefore open to abuse, however if properly supervised and monitored it could be effective. It does not reduce the risks of the driver being struck by the fork lift truck or the load.

We visited one distribution centre operated by a large haulage company and the operations we watched are described in section 7.3.1. They had marked the floors of the loading bays to show where the vehicle was to be parked. Around the edge of this area, they had marked a red area, in which the driver was supposed to stand while opening or closing the curtains. This is shown in Figure 54. They are then required to stand by the front of their vehicle while the fork lift truck is operating.

They had provided details of this system to the drivers when they went to reception on arrival. It was also available in four other languages for foreign drivers. During loading or unloading, the fork lift truck driver was in control, however the driver of the vehicle might need to direct how he wanted the vehicle loaded, as happened during our visit.

In practice, the drivers did not keep to the written procedures. This is described in section 7.3.1. One driver was not wearing the high visibility jacket that the procedure requires. He stayed inside the red area, but was at times either close to the load while it was being moved or close to the fork lift truck while it was moving. The second driver continuously walked out of the red area and talked to the fork lift truck driver while he was loading the vehicle.
Overall, although this system appears to address some of the risks highlighted in this report, we do not believe it would provide adequate control, even if it was properly enforced.

In some industries, the nature of the business reduces these risks. At the brewery distribution centre that we visited, the incoming vehicles delivered to one side of the warehouse. Here the drivers fully opened both sides of their curtains, after parking, and then remained in their cabs while their vehicles were unloaded. However, they could be close to a fork lift truck operating in the adjacent bay while they opened their curtains, as happened during our visit.

On one of the other sides of the warehouse, there were the loading bays for the secondary distribution, as shown in Figure 55. Here, they have twice as many trailers as delivery trucks. During the day, while the crews are out delivering, the trailers are loaded for the next day’s deliveries. The loads are picked and laid out for loading, in the order that they will be delivered. The trailers are brought to the bays by shunting trucks and are then loaded. The loaded trailers are then moved to a storage area, ready for the crews to pick up the next day.

As for the multi-skilled drivers at the soft drinks company described earlier in this section, this system is based on the nature of the business. However, it does remove the risks associated with the drivers being in the area during loading (although it was noted that other pedestrians were allowed in the loading area). It may be applicable to other industries with secondary distribution.

One of the concrete manufacturers interviewed had had an accident when a driver gave paperwork showing the loading details to the fork lift truck driver as part of the loading procedure. His foot was then run over by the truck. They decided that they would replace the paperwork with an electronic system. The information is now displayed on a screen for the fork lift truck driver.
They also require the drivers to keep out of the way during loading, by sending them to a separate area. They find this difficult to enforce, as they do not have the resources to fully supervise it. This system may reduce the risks, however, we doubt that it is provides adequate control.

Generally, most companies find it easier to manage the interaction between the drivers and the fork lift truck drivers when they all work for the same company. Drivers may need to supervise loading and this is harder to control if they are contractors.

Lastly, the soft drinks manufacturer who we visited to see the vehicle restraint system described in section 8.3.3, had also established a safe system of work. As the drivers arrived on sites, they reported to reception. Here they were instructed in what they should do. First they parked in the waiting area, and fully opened and tied back their curtains.

The fork lift truck driver then called the driver over when he was ready to load the vehicle. The driver moved it into the bay where it was locked in place by the device described in section 8.3.3. While the fork lift truck was operating, the driver stayed in the cab, unless needed by the fork lift truck driver.

If this site encountered any problems with drivers, then they sent an email to their employer to inform them. The company is building relationships with their hauliers, to improve their awareness of the site’s requirements. They choose contractors to try to ensure that they only use ones that have good, well maintained equipment. However, in busy periods they may have sub-contractors operating, who may have trailers in poorer condition. They will ban trailers if necessary.

The overall culture of this site is based on ‘zero accident behaviour’, a system based on the commitment of individuals to safety, led by management and cascaded down throughout the workforce. One part of this approach is a strong emphasis on monitoring and auditing, which are needed to enforce the safe system of work described above.

If rigorously enforced, this system, in combination with the vehicle restraint, should adequately control the risks associated with the interaction of the driver and the fork lift truck driver.
Potential uses

The examples of safe systems of work described in this section demonstrate that it is not enough to have a system, it must also be enforced. Many of the systems could be effectively applied in other industries and with other vehicles.

8.3.5 Changes to curtains

Although the risks due to the use of curtains and other equipment are lower than the ones dealt with in the last two sections, they also require controlling, where reasonably practicable.

For instance, curtain suppliers have introduced a buckleless curtain. Instead of vertical webbing tightened by a line of buckles, the curtain is hooked on a wire along the side of the vehicle. This is then tensioned along the side of the vehicle, either manually or pneumatically.

One distribution company had welded the centre poles in some of their vehicles so that they could not spring out. However, this was only possible because the vehicles have moveable floors, so they do not need to move the pole during loading or unloading.

8.3.6 Access to vehicles

Suppliers of curtain-sided vehicles can supply trailers with built-in steps. However, these are optional and not everyone purchases them, although one supplier said that they are becoming more popular and are now usually bought. There are various designs, which are not ideal, as they need to be hidden in the chassis when not in use and slid out when needed.

Even if these steps are not ideal, using them should be safer than climbing on and off the bed of vehicles that do not have any means of access.

8.3.7 Safe systems of work

Safe systems that relate to the vehicle driver and the fork lift truck driver were dealt with in section 8.3.4. We present here details of systems put in place to control other risks.

The brewing and paper and board industries, in which loads are most likely to shift and lean against the curtains, have developed systems to deal with this risk.

One general requirement is that drivers open the curtain while keeping the closed part of the curtain between themselves and the load. All of the drivers that we saw opening curtains did this, walking backwards while pulling the curtain towards themselves.

The brewery distribution centre that we visited said that if the load shifts then the curtain will bulge, so the driver should inspect the curtains before opening them. If it is only a slight bulge or they are delivering in the dark (a common occurrence in winter as many deliveries are made early in the morning) it may be difficult to tell that the load has shifted. By tapping the curtain, it may be possible to determine the state of the load.

However, the curtains can bulge on a vehicle in which the load has not shifted. Figure 56 shows a trailer ready for the next day’s delivery, where the kegs are properly loaded but are causing the curtain to bulge. Figure 57 is of a loaded vehicle with the curtain open, showing how close the kegs are to the edge of the vehicle.
If the load appears to have shifted, then the system is for the driver to access it from the other side or from the rear of the vehicle. If this happens on deliveries, where there can be limited access, the driver have to turn the vehicle round. Alternatively, it may be possible to pull back the curtain until it is close to the part of the load that has shifted and then push it back into place before opening the rest of the curtain.

One of the paper manufacturers that we contacted had a similar approach to dealing with bulges. However, they stated that it was an unpredictable problem, which meant that dealing with it was not a ‘science’. They start by putting the vehicle in a segregated area, so that they know that no-one other than the personnel dealing with the problem are in the area.
In their experience, the load usually collapses towards the rear of the vehicle. They try to find out what is wrong, by taking a tentative look from the front of the vehicle. They then work out how to deal with the load. If it appears to be too dangerous, they can refuse to accept it. However it is unlikely that they would allow it back out on the roads, so they would have to deal with it.

They also put pressure on the people who are responsible for sending the unsafe loads to them, the hauliers and customers. They actively monitor the state of loads and they find that their system works reasonably well, although it is not perfect. Their own drivers are reasonable, however they have more problems with contractors and agency drivers.

One of the other paper manufacturers that we contacted also had a safe system of work for dealing with bulges. As at the distribution centre that we visited, if the curtains are bulging on one side, they will open from the other side first. However, if it is bulging from both sides, they will approach from the rear of the vehicle. If necessary, they may open every other buckle along the curtain to see if the bulge gets worse.

The British Recovered Paper Association has published guidance that includes some information on how to deal with shifted loads. For instance, it includes using a clamp truck to hold a bale against the curtain to prevent it falling while the problem is investigated. This guidance is discussed further in section 9.2.

Overall, none of the systems appears capable of removing the risk if the load has shifted, although they should reduce it. However, there may be better controls available, such as using vehicles with an inner layer of netting, as described in section 8.3.2.

Several companies said that if they had to open curtains in windy conditions, then only part of the side should be opened at a time. Only one company, a food manufacturer, said that they would wait for the wind to die down if necessary.

The brewery distribution company that we visited had developed a system for opening jammed curtains. The driver would climb inside the vehicle and open the curtain from the inside, as they would then be closer to the top of the curtain and would be able to move it more easily. However, we feel that this may present a risk of the driver falling from the vehicle when the curtain becomes unjammed.
9 GUIDANCE

One of the objectives of this study was to investigate whether the existing HSE guidance needed to be broadened to include new technology and non-tipper vehicles. In this chapter, we review what guidance is available. We also describe what guidance is under preparation by trade associations and other bodies. Where possible, we have compared guidance from trade associations and companies with the existing HSE guidance and legal requirements.

In the last part of this chapter we have analysed requirements for broadening or modifying the existing guidance. This is based on the interviews we conducted with companies and organisations. In these, we attempted to discover whether the existing guidance was felt to be adequate and whether it applied to other vehicles. If more guidance was required, we asked who should prepare it and what it should cover.

9.1 EXISTING OFFICIAL GUIDANCE

There is some official guidance currently available which relates to the covering and securing of loads on goods vehicles. In this section, we briefly describe this guidance, and comment on its applicability to the vehicles and industries covered in this study.

**Workplace (Health, Safety and Welfare) Regulations 1992, Approved Code of Practice (ACOP)**

The ACOP for these regulations contains some information on how the regulations should be applied to sheeting. Paragraph 139 states: “Where sheeting is done frequently it should be carried out in designated parts of the workplace which are equipped for safe sheeting. Where reasonably practicable, gantries should be provided which lorries can drive under or alongside, so that the load is sheeted from the gantry without any need to stand on the cargo. In other situations safety lines and harnesses should be provided for people on top of the vehicle.”

We believe its meaning is ambiguous. On first reading, it appeared to conflict with the guidance given in HSG136, Workplace Transport Safety, which calls for platforms to be provided where sheeting is done frequently. In the guidance for tipper lorries, HSG148, the term *gantry* is used to describe an overhead beam with a safety line and harness attached. We have used it in the same way in this report. However, when this system is used, the driver has to stand on the load. We presume that the ACOP is referring to platforms, not gantries.

**HSG148 Sheeting and Unsheeting of Tipper Lorries**

This was published by the HSE in 1996 to help employers, quarry owners and self-employed lorry drivers to meet their legal duties regarding the sheeting of tipper lorries. It covers risk assessment and the measures that need to be taken to avoid or to reduce risks. It describes and compares a range of sheeting systems, including mechanical sheeting, overhead gantries, platforms and traditional loose sheeting. It also includes ergonomic considerations, access and manual handling, and gives an example of a system of work for manual sheeting and unsheeting.

This is an apparently thorough document which covers one specific topic for one vehicle type. As part of the interviews conducted during this study, we asked if companies and organisations (that operated waste vehicles or flat beds) whether they felt that this guidance was applicable to vehicles other than tipper lorries.
Only two participants felt that this guidance could be used for other vehicles. One health and safety manager at a port said that it applied to bulkers as well as tippers. He saw it as general guidance, and that the principles could be applied to all vehicles. One haulage association believed that it was applicable to other vehicles, for instance they felt that skips were almost covered by it. However, they also felt that as it was written for tipper lorries, operators of other vehicles would not think it is relevant to them.

However, all other participants who knew enough about the guidance to comment on it felt that it did not apply to other vehicles. These were three waste companies and four other companies or organisations. All of these said that it was too specific and not relevant to the vehicles they used. For instance, one said that it was “no good for flats”.

We believe that it is applicable to other vehicles, especially waste bulkers and large waste containers, and that the general principles of the guidance are relevant to all vehicles that need sheeting. However, it appears that it is often perceived as being specific to one vehicle and/or industry, reducing the likelihood that it will be used in other industries for other vehicles.

**HSG136 Workplace Transport Safety**

This was published by the HSE in 1995 to provide a source of practical guidance and reference to assist owners, employers and managers, including hauliers and those responsible for contractors, at workplaces where any form of transport is used. It covers the management of road transport, including assessing risks and organising for safety. It also gives practical advice on securing a safe workplace and safe vehicles, and establishing safe working practices. It includes some examples of safe working practices for particular activities, including sheeting and unsheeting of loads, and loading and unloading.

The section on sheeting and unsheeting gives general guidance on the choice of precautions and how they should be applied, and describes recommended practices for manual sheeting and unsheeting. This is very similar to the guidance for tipper lorries, HSG148, described above.

The Fertiliser Manufacturers Association (FMA) has based their draft guidance on this section. One fertiliser manufacturer has already started to issue this to their haulage contractors. Our full comments on this guidance are presented in section 9.2, however we believe that it is not adequate to sufficiently reduce the risks identified in section 7.2.1. Hauliers’ comments on the FMA guidance were included in section 8.2.7, and were mostly negative.

As for HSG148, we believe that the general principles of this part of HSG 136 are applicable to most vehicles that need sheeting.

However, we believe that the recommended practice for manual sheeting in HSG136 is not appropriate for any of the tasks we have analysed for this study. Also, the pictures included in the guidance are of tipper lorries. One manufacturing company commented that this guidance was the same as HSG148 and only applied to tippers. We believe that it is possible that HSG 136 may be not be perceived as being relevant to all vehicles, although this is less likely than for HSG148.

The section on loading and unloading gives general guidance on how to manage these activities, plus procedures that should be followed. It does cover most of the risks identified in this study, however, there is little detail. For instance, it says that “appropriate checks will need to be made before unloading to ensure that loads have not moved during transit, and are not likely to fall out when doors are opened, curtain sides removed, and ropes, sheets and banding taken off”. It does not give any more information on what the appropriate checks might be.
One large haulage and distribution company interviewed for this study said that HSG136 was not detailed enough. We believe that it gives good general guidance, however, it is not possible in one booklet to provide the detail that many companies and organisations are seeking, as described in section 9.3.

**Code of Practice: Safety of Loads on Vehicles**

This was first published by the Department of Transport in 1972. The current edition was last revised in 1984. It is now the responsibility of the Department of the Environment, Transport and the Regions (DETR).

This code covers how loads should be secured so that there is no likelihood of them moving or falling off when in transit on the roads. It includes guidance on the principles of load safety, choice of vehicles and arrangement of loads, load securing equipment, etc., plus additional requirements for specific types of loads.

It covers a wide range of vehicles and loads, however it says that “it is not possible to cover all the circumstances likely to be encountered by drivers and operators”. It does not cover the safety of drivers and other people during securing or covering loads.

The information in this code still appears to be relevant, however, it is now out of date. The DETR would like to bring it up to date and produce a new code, although they do not know when this will happen. Draft revisions of this code have been issued for consultation, in 1994 and 1996. There is no intention as far as we are aware to extend it to include any issues other than load retention.

We believe that although this code is still valid, it needs to be revised urgently.

**9.2 OTHER GUIDANCE**

In addition to official guidance, a number of trade associations have published or are preparing to publish guidance relating to the subject of this study. In this section we describe what is available and what we have found is being planned, and compare it with the existing HSE guidance and legal requirements.

**Freight Transport Association (FTA)**

The FTA publishes the “Yearbook of Road Transport Law” annually, which is provided to members free of charge. It provides detailed information on all aspects of road transport law, together with up to date information in other closely related areas such as health and safety and employment law.

This appears to be a comprehensive manual, covering all aspects of law as it relates to haulage by road. The section on health and safety is in two parts. The first part covers the main health and safety laws affecting vehicle operators. The second looks at some commonly encountered high risk activities and explains how control measures should be implemented.

The second part includes a section on sheeting and unsheeting. This gives an overview of why sheeting is carried out, the main hazards and the recommended approach for carrying out a risk assessment. This includes how to eliminate or reduce the risks. The approach taken agrees with HSG 136 and HSG148, and, if followed, should enable vehicle operators to comply with legal requirements.
It does not include any guidance on how manual sheeting should be carried out, but refers instead to HSG136 and HSG148.

The section on loading and unloading gives a brief overview of the main safety precautions, and is similar in content the HSG136, although with less detail.

As we described in section 6.5, the FTA was involved in a working group which was preparing a safe operating procedure for tilt trailers. We were unable to see a copy of the safe operating procedure, as it was still under discussion. We do not know if this will be applicable to other vehicles or any industries other than steel.

**National Association of Steel Stockholders**

Also at the time this study was carried out, the National Association of Steel Stockholders was about to publish guidance called “Load Safety”, which will cover loading and unloading steel stock, and securing and sheeting of loads. The HSE has been involved in the preparation of this guidance. Again, we were unable to see a copy.

**Environmental Services Association (ESA)**

The Sheeting and Unsheeting Working Group established by the health and safety committee of the ESA was set up to provide clear guidance on the precautions to be taken to prevent injury during sheeting and unsheeting of waste vehicles.

At the time of this study, the group had drafted this guidance, and it was being considered by the group’s members. Our comments here are based on the draft guidance, which may be altered before it is published.

The guidance comments on short and long term remedies. It is broadly in agreement with the HSE guidance and legal requirements, recommending in the long term that sheeting devices should be fitted on new vehicles, and listing short term measures which can be adopted.

It also recommends that industry should consider whether it is reasonably practicable to retro-fit sheeting devices to existing vehicles, for loads or operations where the risks can only be satisfactorily reduced in this way. However, this is omitted from the list of recommendations. It also does not mention the possibility of reducing the number of vehicles or containers that require sheeting by replacing them with alternatives that contain the load.

Apart from these issues, it does appear to comply with HSE guidance and legal requirements.

**British Recovered Paper Association (BRPA)**

The BRPA has issued guidance which is relevant to this study, entitled “Waste Paper Industry Guidelines on the Safe Loading and Unloading of Vehicles”. This was developed by a working group, in which the HSE was involved.

This guidance is intended to assist waste paper companies when they examine their method of loading and unloading of vehicles. It includes guidance on risk assessment, loading and unloading, and sheeting and unsheeting. As well as general guidance, it also includes detailed procedures.

The sections on sheeting and unsheeting are based on the guidance in HSG136, including the requirement to use mechanical sheeting systems whenever possible, including on bulkers. The guidance on manual sheeting is based on the procedure in HSG136, however, the unsheeting
procedure is safer. They recommend unsheeting from the ground, by untying the sheet and pulling it off.

It also includes guidance on dealing with unstable loads. For example, it recommends providing a separate isolated area, contingency planning, allocating responsibilities, training, etc., and a method for dealing with loads that are leaning against curtains.

Overall, this appears to be good detailed guidance, which, although it is based on HSG136, has been adapted to better suit the waste paper industry. It covers a wide range of safety issues that are important in this industry. It appears to broadly comply with both HSE guidance and legal requirements.

**Fertiliser Manufacturers Association (FMA)**

The FMA has drafted guidance on “The prevention of accidents during sheeting of flat-bad lorries and tautliners”. The second draft was provided to us by the FMA. It states that the guidance is based on and amplifies the information given in HSG136, Workplace Transport Safety.

Part of the guidance is almost identical to some of the sections in HSG136 that relate to sheeting and unsheeting of loads. The main differences are that some paragraphs have been omitted. These relate to mechanised sheeting devices (which do not yet apply to fertiliser manufacturers), and to the requirement to avoid the need for anyone to go on top of the load, for example by providing platforms where sheeting is done frequently. This does apply to fertiliser manufacturers.

The other changes made to the guidance are minor, however they do slightly reduce the requirements of HSG136.

The FMA have extended the guidance by adding requirements to routinely inspect sheets, ropes and/or straps, as described in section 8.2.7 of this report. These appear to represent good practice.

They have also added guidance covering the use of curtain-sided vehicles (tautliners). This is loosely based on the same section of HSG 136. It is brief and concentrates mostly on the means of access to the top of the load. It does not explain why drivers should need to climb on top of the load on a curtain-sided vehicle, although we believe that this may be to tie up the load, as described in section 6.2. However, there is also similar guidance for the routine inspections of ropes and/or straps used to secure the load, which represents good practice.

The FMA have not tailored HSG136 sufficiently to suit the sheeting and unsheeting of fertiliser bags. For example, it is not possible to comply with the guidance when sheeting a double stack of fertiliser bags, as it states that the driver should walk down the centre of the load. They have only made brief references to control measures that provide better protection than safe systems of work. Although they quote the ACOP to the Workplace (Health, Safety and Welfare) Regulations, as described near the start of this chapter, they do not recommend that gantries or platforms should be installed where sheeting is done frequently.

Overall, the guidance produced by the FMA is not adequate to control the risks associated with the sheeting of fertiliser on flat bed vehicles. In our opinion, it does not comply with the available HSE guidance or legal requirements. The guidance on the use of curtain-sided
vehicles also appears to be inadequate to control the risks, especially if drivers are climbing on top of the load.

**Guidance produced by companies**

Some of the companies that we interviewed for this study had developed their own internal guidance and procedures. We were able to examine some of these. Our comments on them are presented in the relevant sections on safe systems of work in Chapter 8: 8.1.6; 8.2.7; and 8.3.7.

### 9.3 GUIDANCE REQUIREMENTS

During the interviews with companies and organisations, we asked what they thought about guidance, including whether it was needed, and if so, who should prepare it. In this section, we present a summary of their comments.

In the interviews, 50% of the participants felt that guidance was needed, 18% thought it was not and 32% did not express a view.

These are some of the comments from those who did not want any further guidance:

- “we do not see the need”
- “not a problem”
- “not needed, drivers are experienced and should be capable of deciding for themselves”
- “no need”
- “we are the leaders in our field and any guidance tends to be based on what we do”.

The people who did want guidance mostly tended to be enthusiastic about it:

- “want more detail on the whole thing”
- “yes, we want guidance and we would adapt it to our site”
- “would love it, we could enforce it on our hauliers”
- “need a national document for all to follow”
- “excellent idea”
- “yes, we need to educate the drivers”.

Some of the participants who wanted guidance gave comments about what type it should be:

- “we need specific guidance”
- “it should be included in driver training”
- “it should cover all aspects, including loading, security of the load, sheeting, etc.”
- “specific for our industry” (from a waste company)
- “for specific types of vehicles, like the tipper guidance”
- “yes, to stop double stacking and make shelter compulsory” (from a haulier who carried fertiliser)
- “it should be part of the driving test”.

97
They also had views on who should publish it:

- “if it were official, that would help us enforce it”
- “we want guidance from the HSE”, as the trade association guidance is “weak and not enforced”
- “definitely from the HSE”
- “from the Environmental Services Association and endorsed by the HSE” (from a waste company)
- “the HSE and the Road Haulage Association should publish guidance for all loads and all vehicles”
- “from the HSE or the Freight Transport Association”.

It is clear from these responses that there is a need for guidance, and that the majority of our participants who want guidance want it to be official. This would help them enforce it with the haulage companies that they use.

The fact that some trade associations are preparing guidance, as described in section 9.2, also demonstrates that guidance is required.

One participant who worked for a large distribution company suggested a number of different formats:

- extend HSG148 to cover all vehicles, and extend and revise HSG136
- publish specific guidance, as in the EH and CS series
- publish general guidance, backed up with specific case studies to show how it can be applied.

We believe that the last of these format would be the most suitable, as it could cover a wide range of vehicles and loads to illustrate how to apply general guidance in different circumstances. However, there is also scope for extending HSG148, for instance to include waste vehicles, especially bulkers.

We also believe that whenever possible, the HSE should publish guidance, based on information from the relevant sectors. This has more impact on companies than guidance published by trade associations. However, trade associations should also be encouraged to publish guidance, which should be prepared in conjunction with the HSE and endorsed by them.

One of the equipment suppliers that we contacted believes that there should be a British Standard for the load restraining systems on curtain-sided vehicles. They and their local trade associations had tried to get this established. However, although their idea was met with enthusiasm, it was not taken any further. We believe that this should be seriously considered as the design and integrity of this equipment is critical in preventing loads being shed on the roads and when vehicles are opened.
10 RECOMMENDATIONS

We present our recommendations in four sections. The first section includes general requirements which could affect most or all industries and vehicles. The second section gives recommendations about particular risks which are applicable to more than one industry. The third gives recommendations which are specific to particular vehicles and the fourth to specific industries.

Our recommendations cover actions that might be taken by various parties involved in minimising accidents associated with the covering and securing of loads, including manufacturing companies, haulage and distribution companies, suppliers, trade associations and government bodies. We also outline areas in which we believe further research should be considered.

10.1 GENERAL RECOMMENDATIONS

These recommendations could affect most or all industries and vehicles. They cover general issues which either should be addressed by government bodies or by everyone involved in the haulage of goods by road. We have not prioritised them, as some are long term, but need starting as soon as possible, while others are short term actions, which could provide quicker results.

- **Improve co-ordination and co-operation between the government bodies** (HSE, DETR and the Environment Agency) which advise on and/or enforce the legal requirements relating to the securing and covering of loads. At present, the various requirements relating to load safety, environmental protection and occupational health and safety are conflicting. These requirements need to be rationalised to ensure that all the issues are adequately addressed.

- **Improve the training of goods vehicle drivers.** This should include: introduction of the log book scheme that the DSA is considering; the promotion of training in the sheeting and securing of loads by the HSE and trade associations; the provision of such training by suitable bodies; and use of this training by drivers’ employers.

- **Combine official guidance, so that employers have one source that covers all related risks.** For instance, guidance for the paper and board sector should cover all aspects of load security and safety, including preventing accidents on the road and during loading, securing, unloading, etc.

- **Revise the DETR Code of Practice on the safety of loads on vehicles.**

- **Continue the policy of pressurising manufacturers and site operators** to enforce health and safety requirements and standards on the haulage companies, customers and suppliers that they deal with. This study has shown that this has been successful in some areas.

- **Enforce legal requirements where necessary.** For instance, if one fertiliser manufacturer can install gantries, then other companies should be able to as well.

- **Encourage more co-ordination by trade associations of their members.** Where these have been active in establishing working groups that bring interested parties together, such as in the waste industry, then this has been beneficial in finding solutions to some of the identified problems.

- **Control contractors by implementing suitable selection, supervision and monitoring procedures.** This should include providing sufficient information and, if necessary, training to ensure that all drivers are aware of safety requirements and how to comply with them.
• Educate and persuade customers and suppliers, whose actions affect the health and safety of drivers and other people. This is relevant in a number of sectors. For example, waste companies need to ensure that customers do not overload or badly load waste containers, as this affects the safety of their employees who have to sheet the containers. Paper companies need to persuade companies who send them loads which may shift in transit to properly restrain the loads. This must include refusing to deal with companies who will not comply with safety requirements.

• Collect case study material to illustrate the application of different controls to a range of vehicles in different circumstances.

• Evaluate the feasibility of preparing a British or European Standard for load restraint systems on curtain-sided vehicles.

10.2 RECOMMENDATIONS FOR SPECIFIC RISKS

These recommendations relate to particular risks that have been identified in this study, which affect more than one vehicle type. They should be implemented in all relevant sectors. They have been listed in approximate order of priority.

1. Establish safe systems of work to control the interaction of the vehicle driver and the fork lift truck driver, in order to minimise the time that the driver is in the area while the fork lift truck is operating. Each site needs to establish its own system, based on HSE guidance.

2. Monitor and supervise safe systems of work to ensure that all drivers comply with them.

3. Install vehicle restraint systems where reasonably practicable.

4. Use simpler systems (such as large stop signs or key retention systems) to prevent drivers pulling away early, where vehicle restraint systems are not reasonably practicable. Monitor and enforce the use of these systems.

5. Establish preventative maintenance procedures so that all equipment such as ropes, straps, curtains, sheets, nets, etc., are regularly inspected to ensure they are in good condition and safe to use.

6. Evaluate equipment to ensure that it is the most suitable available. For example, using the lightweight sheets rather than traditional tarpaulin sheets where possible, using the best restraint systems for loads that are difficult to restrain.

10.3 RECOMMENDATIONS FOR SPECIFIC VEHICLES

These recommendations relate to most or all uses of the two vehicles included in this study that are the most widely used. Again they are listed by approximate order of priority. Recommendations for waste vehicles are presented in section 10.4.1.

10.3.1 Flat bed vehicles

1. Follow the general principles of the HSE guidance for tipper lorries:
   • Eliminate sheeting whenever possible, to ensure that it is only used if there is no alternative. Secure loads by roping or strapping instead;
   • Install gantries, where possible, and ensure people are trained to use them, and enforce their use;
   • Only use manual sheeting and unsheeting, with or without platforms, if no other options are feasible.

2. Develop sheeting devices for flat bed vehicles, which will remove the need to climb on top of the load. This is the area where there has been the least progress in developing mechanised sheeting devices, however we believe that such a device is possible.
3. **Investigate the use of sheet support tables on flat bed vehicles**, in conjunction with lightweight sheets, to remove any need for drivers to unsheet from the top of loads. These could easily be retrofitted to existing vehicles.

4. **Prepare and publish official guidance in the safe use of flat bed vehicles**, as described in section 9.3.

5. **Investigate the possibility of sheeting or netting vehicles from the floor using two people.**

10.3.2 **Curtain-sided vehicles**

1. **Establish safe systems for checking whether the load has shifted in transit and for dealing with ‘bulging’ loads.** This is of higher importance in some sectors, however all industries should have procedures to deal with shifted loads, even if they are unlikely to occur.

2. **Prepare and publish official guidance in the safe use of curtain-sided vehicles**, as described in section 9.3.

3. **Establish and implement safe systems of work for opening and closing curtains**, etc.

4. **Ensure that there are safe means of access to the deck of all vehicles**, by purchasing steps on new vehicles and retrofitting them to existing vehicles.

10.4 **RECOMMENDATIONS FOR SPECIFIC INDUSTRIES**

We have grouped these by industry sector, to give an overview of what we believe should be the approach to managing the risks identified by this study in both the short and long terms. In each section, they are in approximate order of priority.

These recommendations are in addition to the ones in the preceding three sections.

10.4.1 **Waste and recycling industry**

This industry presents the highest risks, so high that, in our opinion, sheeting bulkers and large containers without any protection other than a safe system of work is not acceptable. Waste companies are actively seeking solutions to these risks, and there are enough available now to reduce risks.

1. **Complete and issue the industry guidance prepared by the Environmental Services Association.** This should be endorsed by the HSE and enforced.

2. **Fit mechanised sheeting devices to all new vehicles and retro-fit to existing vehicles,** and train drivers in how to use them.

3. **Install gantries at transfer stations and landfill sites,** under cover unless this is not practicable. Train drivers to use them and enforce their use, and the use of suitable personal protective equipment. Gantries are not the most effective control method, but can be provided in the short term to be used until all vehicles are fitted with sheeting devices.

4. **Evaluate the use of platforms on transfer stations and landfill sites** to analyse how much they reduce risks.

5. **Improve the packing of bulkers and containers at transfer stations and civil amenity sites.**

6. **Evaluate and increase the use of vehicles and containers that do not need sheeting.**

7. **Develop sheeting devices further,** to improve their ability to cope with unevenly loaded and overfilled containers.

8. **Re-design access ladders on containers,** if there is a continuing need to access the top of them.
10.4.2 Fertiliser manufacturers

As for the waste industry, the risks when sheeting and unsheeting fertiliser bags on flat bed vehicles are high enough to require that manual sheeting should not be allowed. Although sheeting devices are not yet available for flat bed vehicles, there are solutions that can be used.

1. **Stop all double stacking of fertiliser bags**, as this increases the risks when sheeting, solely to achieve a bigger payload.
2. **Stop partial sheeting of the load**, carried out by the driver on the bed of the vehicle while the fork lift truck is picking up the next load.
3. **Install gantries at all sites where bags of fertiliser are loaded onto flat bed vehicles**, under cover unless this is not practicable. Train drivers to use them, and enforce their use and the use of suitable personal protective equipment. Gantries are not the most effective control method, but are the best way of controlling risks in the short term.
4. **Improve the guidance drafted by the Fertiliser Manufacturers Association**, so that it can be published with an endorsement by the HSE, and enforced.
5. **Use lightweight sheets instead of heavier tarpaulins.**
6. **Evaluate the use of platforms to analyse how much they reduce risks.**
7. **Fit mechanised sheeting devices as soon as they become available.**
8. **Investigate the design of the fertiliser bags to find an alternative that does not retain water.**

10.4.3 Brick, concrete and other hard products

These products require a similar approach to that recommended for fertiliser manufacturers. Although the overall risk levels may be lower, action should be taken to remove the need for drivers to work on top of the loads.

1. **Eliminate the need to sheet on loads that do not require protection from the weather**, such as shrink wrapped bricks, by using webbing, ropes or straps.
2. **Stop partial sheeting of the load**, where the driver nets half of the load while loading continues on the rest of the vehicle.
3. **Install gantries where flat beds without cranes are loaded**, under cover unless this is not practicable. Train drivers to use them, and enforce their use and the use of suitable personal protective equipment.
4. **Evaluate the use of gantries with vehicles mounted with cranes.**
5. **Evaluate the use of platforms for both vehicles with and without cranes**, to analyse how much they reduce risks.
6. **Use nets or lightweight sheets instead of heavier tarpaulins.**

10.4.4 Steel

When transported on flat bed vehicles, steel coils require a similar approach to that recommended for fertiliser manufacturers. The use of tilt trailers requires further investigation.

1. **Review the safe operating procedure that the Freight Transport Association is preparing**, as soon as it is available.
2. **Evaluate whether gantries should be installed where steel is sheeted on flat bed vehicles.**
3. **Evaluate the use of platforms** to analyse whether they are suitable for use in the steel industry.

4. **Install gantries or platforms**, depending on the outcome of the short term recommendations.

5. **Investigate the use of tilt trailers and other similar vehicles.**

**10.4.5 Paper and board**

The highest risk is of the load shifting in transit, so efforts should be made to eliminate this risk as are as possible, however this will be difficult in the short term.

1. **Evaluate the use of additional or alternative restraint systems**, such as an inner layer of netting as described in section 8.3.2.

2. **Follow up any unsatisfactory loads with the company who sent it** to try to ensure that they improve their methods of load restraint. Refuse to deal with any companies that do not comply with safety requirements.

**10.4.6 Breweries**

Although considerable advances have been made in this industry, more effort is required to prevent accidents due to loads shifting.

1. **Evaluate the use of additional or alternative restraint systems**, such as an inner layer of netting as described in section 8.3.2, where relevant.

2. **Evaluate alternative vehicles, such as the FBD** as described in section 8.3.1.

3. **Work with equipment suppliers** to develop improved vehicles and restraint systems.

**10.4.7 Other industries, including general haulage and distribution**

We recommend that all other industries, including general haulage and distribution companies, should implement those of the above recommendations that are relevant to them.
11 CONCLUSIONS AND FURTHER RESEARCH

The existing position
The covering and securing of loads on the haulage vehicles included in this study can be high risk tasks, which have the potential to kill and seriously injure people, especially drivers. Some of the industries contacted for this study were well aware of the risks associated with the covering and securing of loads. For example, the waste industry has the highest risk levels and is developing controls to minimise these risks.

In other industries, the awareness of the risks and the effort being put into controlling them were lower. This appeared in some sectors to be because there were other risks which were higher priority. However, in others it appeared to at least partly due to a lack of appreciation of the risks. In a few companies (mostly small hauliers) and organisations that we interviewed, securing and covering of loads was not seen as a risk.

Where companies have worked together under the co-ordination of a trade association, some sectors, for example the waste industry, have made progress and solutions have been found and shared. However, we did find that in one sector where the trade association has been involved, the results were not adequate.

We discovered that there are solutions available to eliminate or control most of the risks we identified. The problems are either already solvable, or could be with some more development and investigation.

Overall, we do not consider that safe systems of work are sufficient by themselves to adequately reduce the risks of covering and securing loads, especially for the highest risks, which include: working at heights on hazardous surfaces; dealing with loads that have shifted in transit; and drivers working in the same area as fork lift trucks that are loading or unloading.

Future direction
Some of the solutions found in this study did need further development. These need to be evaluated by equipment suppliers in conjunction with the companies who would use them, and they could be the subject of future projects.

We believe that there is a need for more enforcement and more guidance. Some companies were not complying with the existing guidance and we believe that the lack of specific guidance may encourage this. Guidance should be either published by the HSE or by industry, as long as it is endorsed by the HSE.

At present, anyone operating haulage vehicles has to comply with a wide range of legal requirements, some of which conflict. There needs to be close co-operation and co-ordination between the relevant government bodies to allow different risks to be balanced and minimised. This should include the preparation of official guidance that covers all risks, including road safety, occupational health and safety and environmental protection.

Our detailed recommendations include actions that are directed at not only site and vehicle operators, but also the HSE, other government bodies, trade associations and equipment suppliers. If these parties are encouraged to consider and implement our recommendations, we believe the results will have a positive impact on health and safety.
12 REFERENCES

British Recovered Paper Association.

Department of Transport.
Code of Practice. Safety of Loads on Vehicles.

Fertiliser Manufacturers Association.

Freight Transport Association and Leyland DAF Trucks Ltd.
Safe Loading.
Freight Transport Association, Tunbridge Wells. 1996.

Freight Transport Association
2000 Yearbook of Road Transport Law.

Health and Safety Executive
Manual Handling in Drinks Delivery
NSE Books. 1994. IAC(L)8D.

Health and Safety Executive
Safe unloading of steel stock.
HSE Books. 2000. INDG313

Health and Safety Executive
Sheeting and unsheeting of tipper lorries.

Health and Safety Executive

Health and Safety Executive

Sharp E.
Safer Sheeting for Flatbed Transport and Stacks
MAIL ORDER
HSE priced and free publications are available from:
HSE Books
PO Box 1999
Sudbury
Suffolk CO10 2WA
Tel: 01787 881165
Fax: 01787 313995
Website: www.hsebooks.co.uk

RETAIL
HSE priced publications are available from good booksellers

HEALTH AND SAFETY ENQUIRIES
HSE Infoline
Tel: 08701 545500
or write to:
HSE Information Centre
Broad Lane
Sheffield S3 7HQ
Website: www.hse.gov.uk

CRR 305/2000