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**Analysis of RIDDOR Machinery Accidents in
the UK Printing and Publishing Industries
2003-2004**

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EXECUTIVE SUMMARY

Objectives

The Health and Safety Laboratory (HSL), the research agency for the Health and Safety Executive (HSE), was commissioned by HSE to analyse data from a sample of accidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 1995 (RIDDOR). These accidents related to employees' contact with moving machinery, in the Printing and Publishing Industry, as reported to HSE and Local Authorities in 2003-2004. The purpose of the analysis was to identify the causes and understand the factors that contributed to these accidents.

Main Findings

- The Printing Press was the most commonly implicated machine, followed by Conveyors. Together these machines were involved in half of the accidents in this sample.
- The main causes of accidents, over three quarters, were due to being drawn into the in-running nip of rollers, contact with moving parts and entanglement with rotating parts.
- The most common consequence of the accidents, over 90%, were injuries to the fingers and hands. The most commonly reported types of injuries, over 80%, were lacerations, and fractures or dislocations, most of them (75%) to the fingers and hands.
- Most accidents, almost three quarters, occurred whilst intervening with the machinery (i.e. freeing blockages, cleaning, webbing-up, make-ready and maintenance).

1 INTRODUCTION

1.1 BACKGROUND

Accidents due to contact with machinery are one of the three most common causes of injury to employees in the Printing and Publishing Industries. In 2003/04 around 17% of all accidents reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 1995 (RIDDOR), by the UK Printing and Publishing Industries implicated machinery. A total of 202 injuries were reported as resulting from contact with moving machinery.

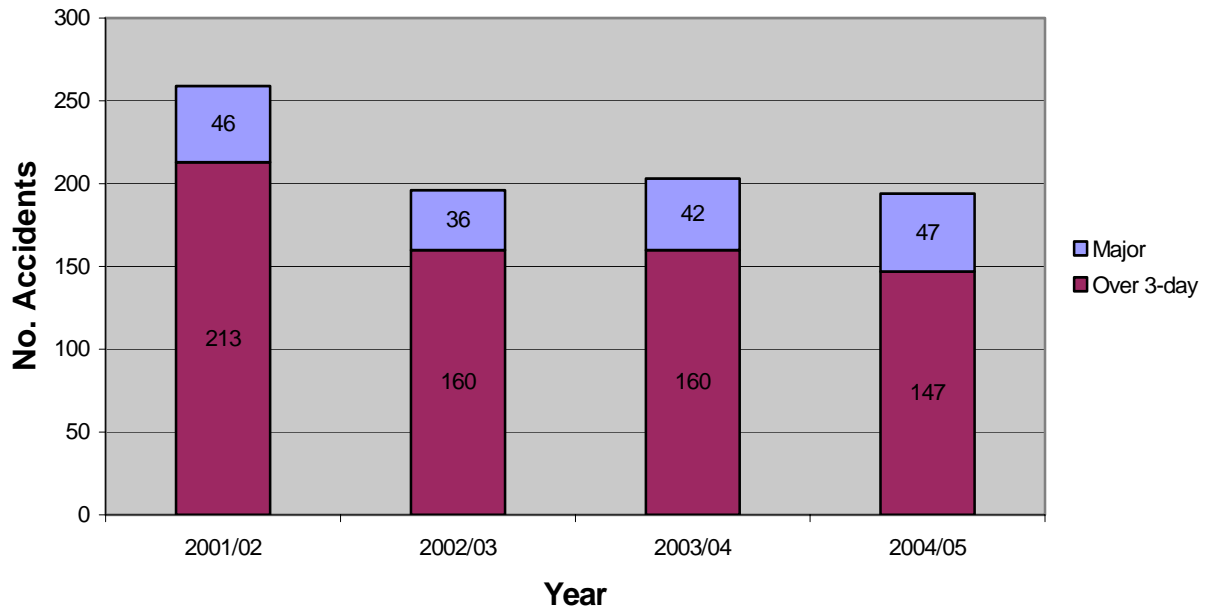


Figure 1 – Machinery Accidents in the Printing and Publishing Industry

Figure 1 shows that the number of machinery accidents reported by the Printing and Publishing Industries between 2001/02 and 2004/05 has decreased by 25%. The present research analyses common factors in the machinery injuries reported in 2003/04.

Figure 2 demonstrates that the injury rate for both the Manufacturing Sector and the Printing and Publishing Industry have decreased from 2001/02 to 2004/05 (HSE Statistics). Throughout the four-year period the injury rate for the Printing and Publishing industry has been consistently lower than the injury rate for the Manufacturing Sector, as a whole.

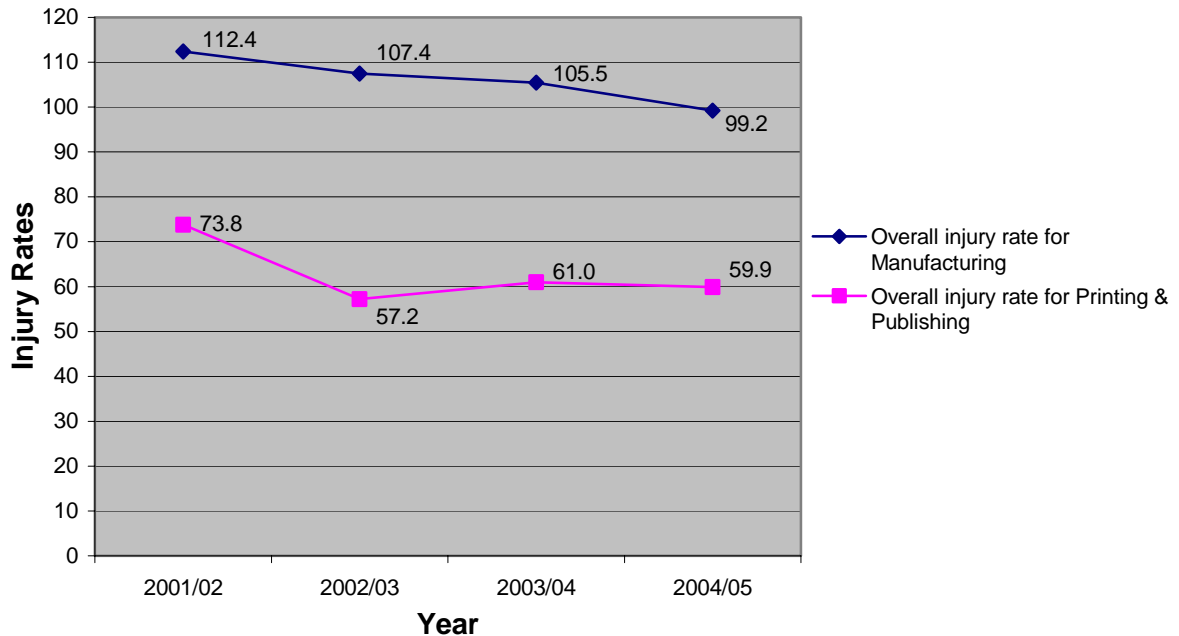


Figure 2 – Comparison of Manufacturing Sector and Printing and Publishing Industry Injury rates per 100,000 employees

Injury rates between 2001/02 and 2004/05 for the Printing and Publishing Industry illustrate a greater decrease (19%), in comparison to the manufacturing sector as a whole (12% decrease).

The discrepancy between the decrease in injury rate and absolute number of injuries reported by the Printing and Publishing industry, (see figure 1), is due to a variance in the employment totals for the industry.

1.2 AIMS AND OBJECTIVES

This piece of work was carried out at the request of the HSE Manufacturing Sector (Printing Group), in support of the ongoing work of the Health and Safety Commission’s (HSC’s) Revitalising Health and Safety Strategy, which aims to reduce work related injuries and ill health by 20% by 2010 (HSE 2000).

The purpose of this research was to analyse the relevant RIDDOR data in order to get a clearer picture of the circumstances that resulted in these accidents. In particular to:

- Isolate and analyse RIDDOR data from 2003/04 regarding accidents in the Printing and Publishing Industry due to contact with moving machinery, as reported to HSE and Local Authorities.
- Evaluate the causes and contributory factors of the RIDDOR reported accidents.
- Identify any trends relating to activity, machine type or process when the accident occurred.
- Provide a written report on the analysis and interpretation of the RIDDOR reported accidents.

2 METHOD

2.1 SAMPLE

The project aimed to identify trends in reported accidents involving employees in the Printing and Publishing Industry (identified by Standard Industrial Classification codes between 22110 and 22250). To achieve this aim, a sample of RIDDOR reports were obtained for more detailed analysis. A search was carried out on RIDDOR using the search terms 'injuries to workers' involving 'contact with moving machinery' in 'Printing and Publishing' as reported to HSE and Local Authorities in 2003/04. The resultant sample of 202 RIDDOR entries were then analysed for common trends.

2.2 DATA ANALYSIS

The RIDDOR sample was imported into a basic Microsoft Access database. From here it was viewed and categorized against a set of criteria based on the customer's initial requirements. The criteria ranged from the primary cause of the injury to the activity and body part involved.

Some RIDDOR reports failed to provide adequate information in the 'notifiers comments', making it difficult to identify the type of machine or process instrumental in the accident. Where possible an informed judgement was made based on the description given of the accident. Where accidents were coded as 'unspecified' this was due to a lack of information in the RIDDOR report.

Following categorisation of the data, two entries were omitted from further analysis due to being misclassified. Charts were compiled from the remaining sample of 200 RIDDOR entries in order to illustrate causes and contributory factors to the accidents. The initial charts identified the most common machine types implicated in the accidents, and informed the following analyses.

3 RESULTS

3.1 TYPE OF MACHINERY INVOLVED IN PRINTING ACCIDENTS

The sample of 200 Printing machinery accidents were first analysed in order to identify the type of machine being used.

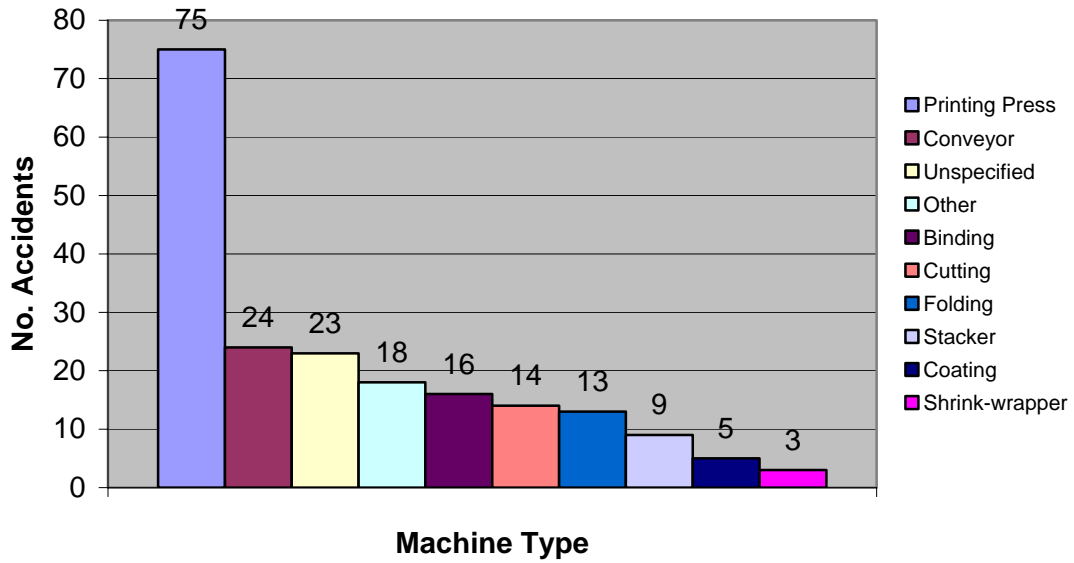


Figure 3 – Printing Accidents by Machine Type (n = 200)

Figure 3 shows that the majority of the 200 accidents involved the Printing Press (38%) followed by the Conveyor (12%).

Together, printing presses and conveyors were involved in half of all the accidents in this sample.

3.2 MOST COMMON CAUSES OF PRINTING ACCIDENTS

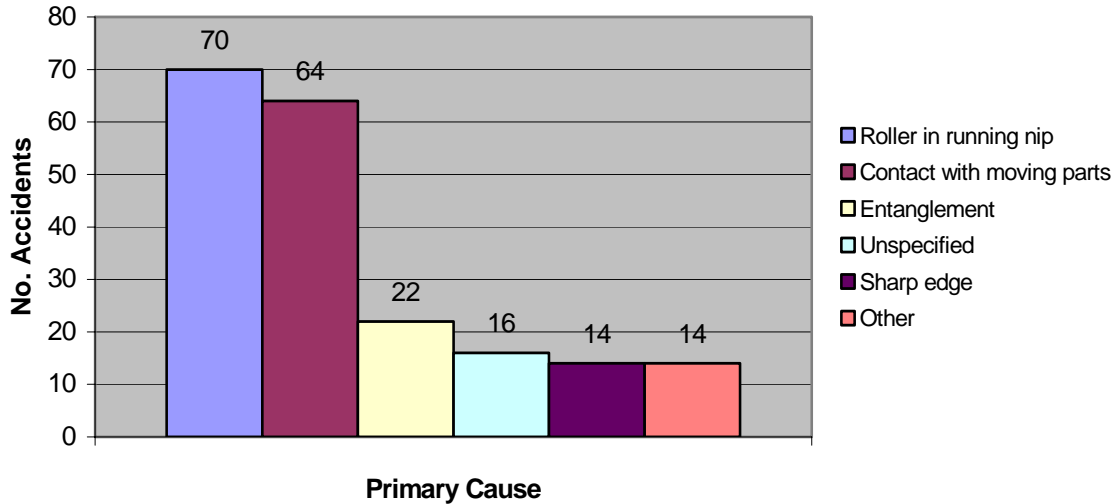


Figure 4 - Primary Cause of all Injuries in the Sample (n = 200)

Figure 4 shows the cause of the 200 reported accidents in the sample. The most common cause across the different machine types and processes was being drawn into the in-running nip of rollers (35%) followed by contact with moving parts (32%) and then entanglement with rotating parts (11%).

Together, this represents just over three quarters of the accidents in this sample.

3.3 NATURE OF INJURIES

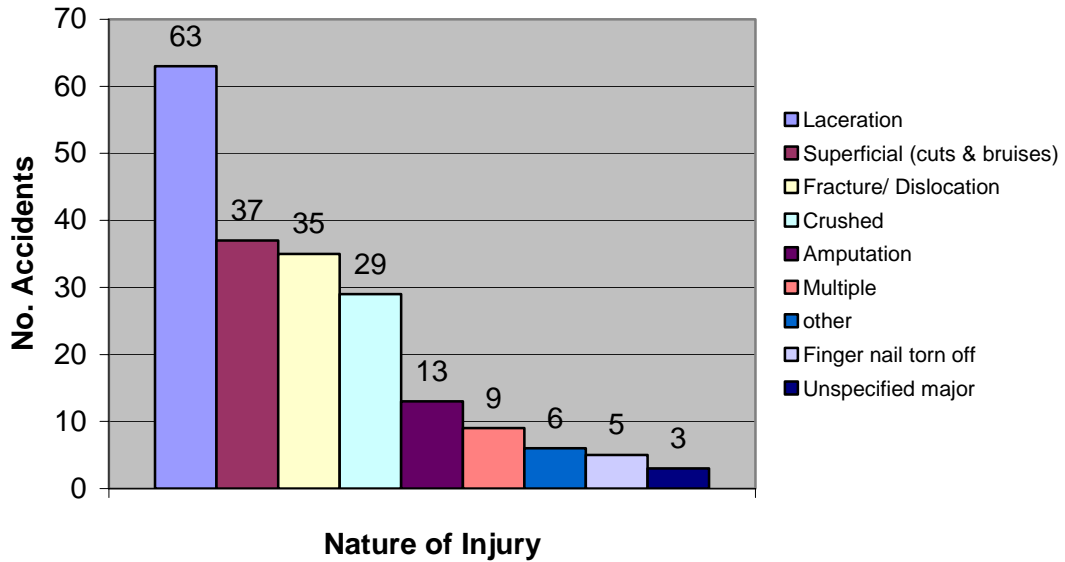


Figure 5 – Nature of Injury Across the whole Sample (n = 200)

Figure 5 shows that the most common types of injury sustained were lacerations, cuts and bruises, fractures and crushing injuries.

Together these injuries account for over 80% of injuries in the sample.

This is consistent with the high number of manual tasks involved in operating machinery, with a lot of moving parts, in the printing industry.

A total number of 39 injuries (20%) were classified as major according to the RIDDOR definition.

3.4 BODY PART INJURED

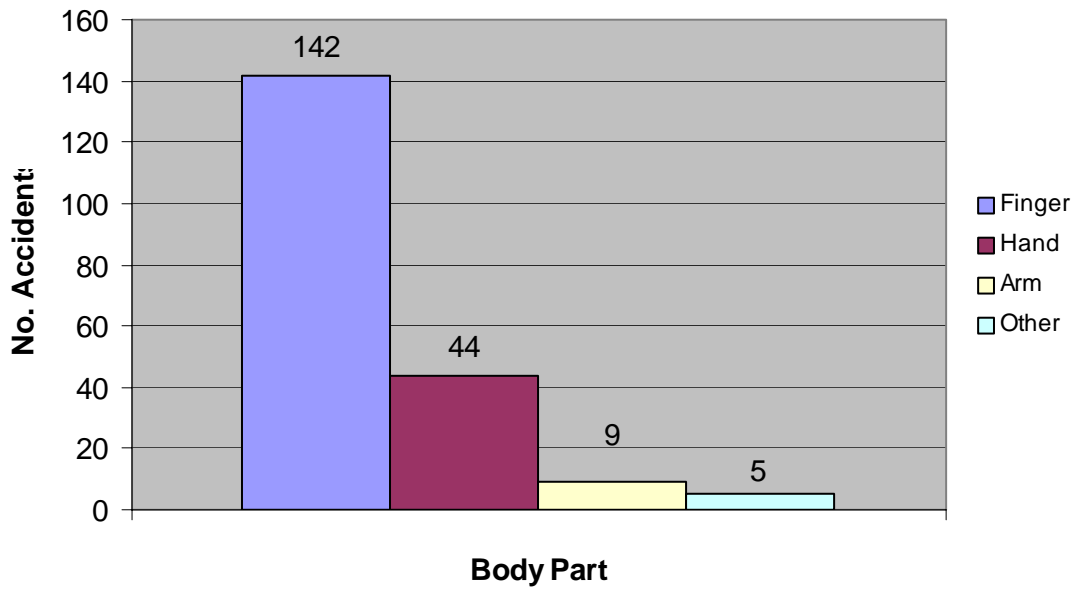


Figure 6 – Body Part Associated with Injury (n = 200)

Figure 6 shows that over 90% of the 200 injuries in the sample were to the finger (71%) or hand (22%).

This is consistent with the manual nature of the job, where a large number of tasks require the use of the hands in close proximity to moving parts of the machinery.

3.5 NATURE OF INJURY TO FINGER AND HAND

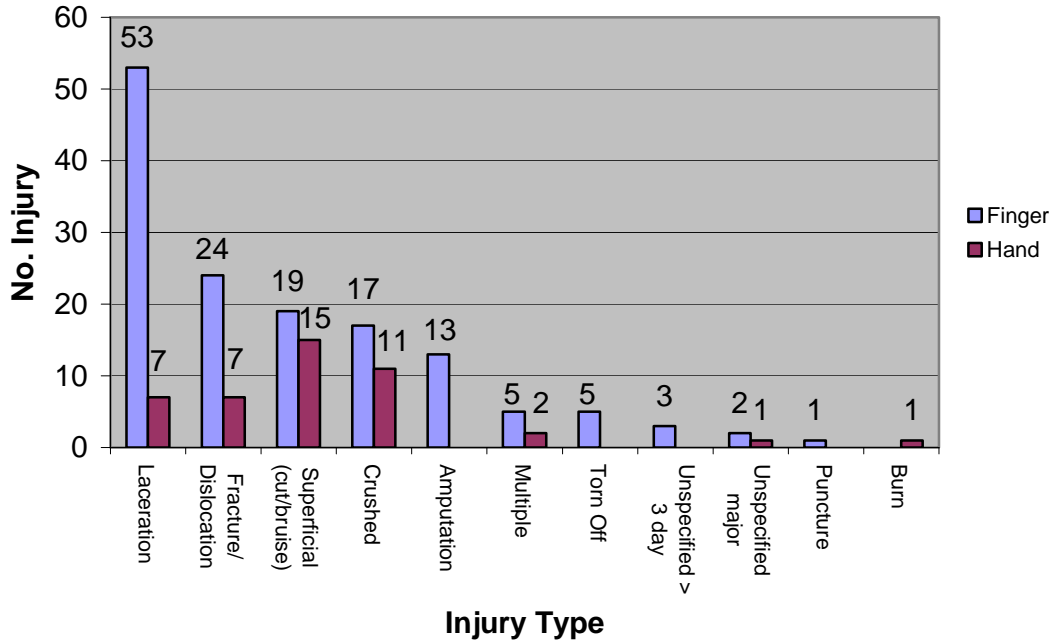


Figure 7 – Nature of Injury by Finger and Hand (n = 186)

Figure 7 gives a breakdown of the nature of injury for the sample of 186 Printing machinery injuries to the finger and hand.

Over a quarter of injuries (28%) were lacerations to the finger, followed by fractures or dislocations of the finger (13%) and superficial cuts and bruises (10%). The most common injuries to the hand were superficial cuts and bruises (8%), and crushing (6%).

Two thirds of all injuries were lacerations, fractures, dislocations or cuts and bruises to the fingers or hand.

3.6 PRINTING ACCIDENT BY ACTIVITY

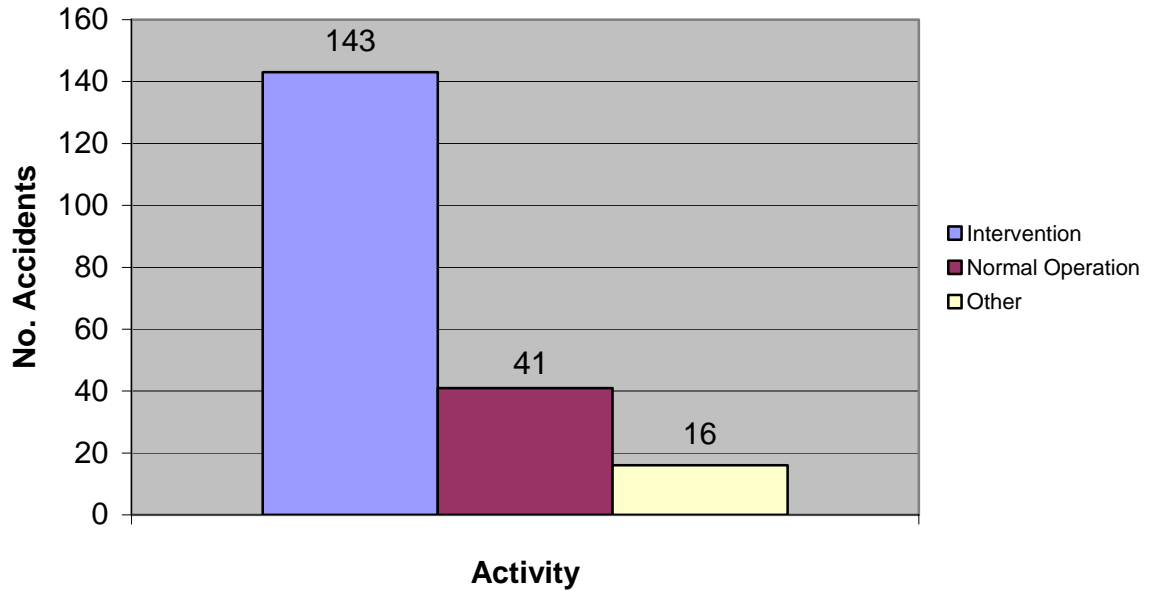


Figure 8 – Printing Accidents by Activity (n = 200)

Figure 8 shows that almost three quarters of the 200 Printing accidents were sustained whilst intervening with machinery (72%). A further 20% of injuries were sustained during normal operation.

3.6.1 Interventions with Machinery

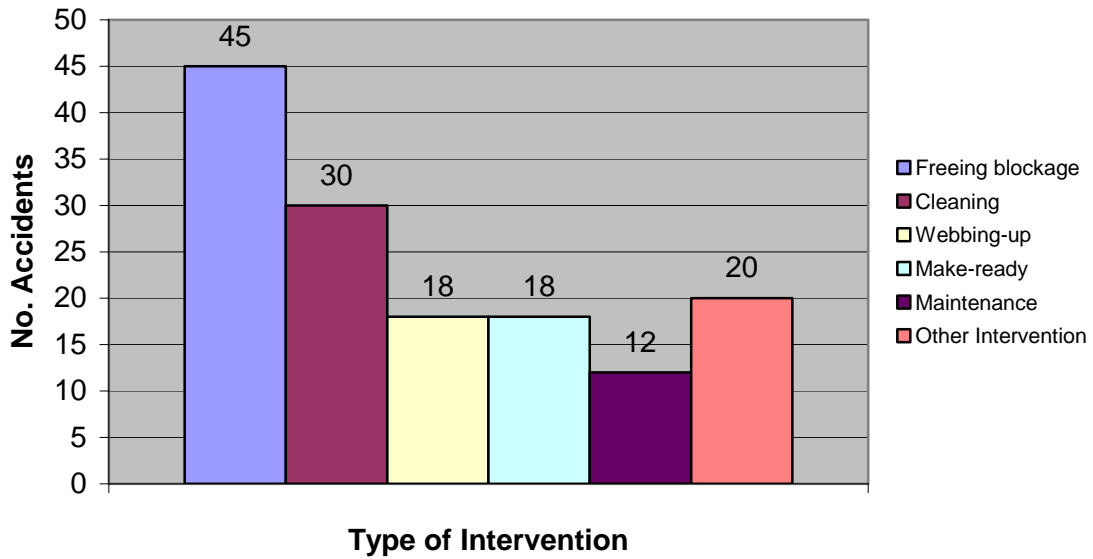


Figure 9 – ‘Intervention’ Accidents (n = 143)

Figure 9 shows the types of interventions involved in the 143 ‘intervention’ accidents. Just under a third of these injuries were sustained when freeing blockages (31%), and around a fifth by cleaning (21%).

A further breakdown is given in sections 3.6.1.1 to 3.6.1.5.

3.6.1.1 Interventions with Machinery: Freeing Blockages

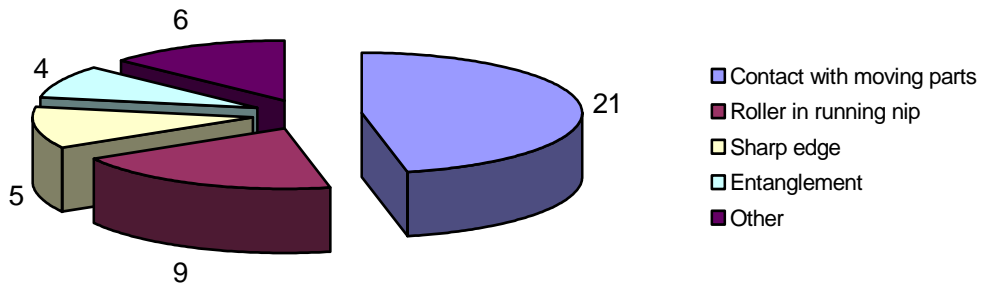


Figure 10 – Freeing Blockage Injury by Cause (n = 45)

Figure 10 shows the most common causes of the 45 accidents that occurred whilst freeing blockages on the machinery. Almost half of the injuries were due to contact with moving parts (47%), followed by being drawn into the in-running nip of rollers (20%) and contact with a sharp edge (11%). All ‘freeing blockage’ injuries implied that the machinery was in motion at the time of the injury, and this contributed to the injury occurring.

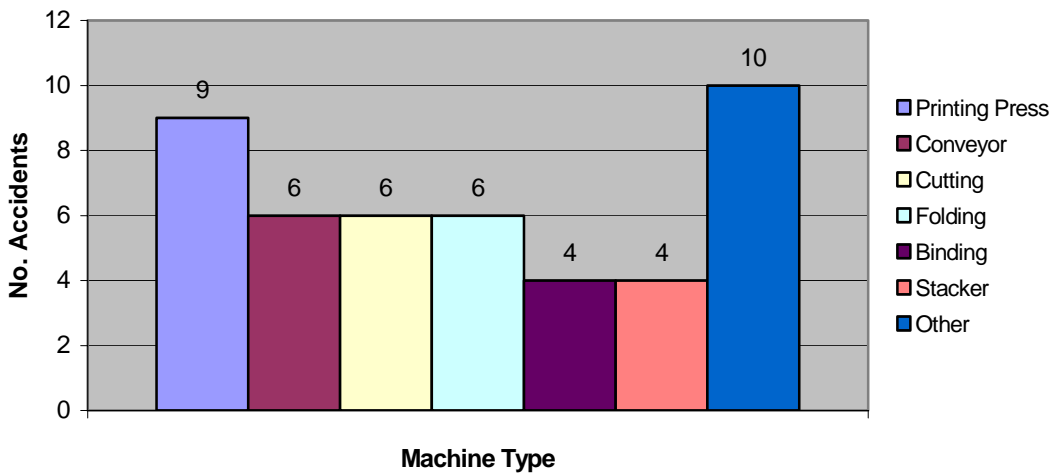


Figure 11 – Freeing Blockage Injury by Machine Type (n = 45)

Figure 11 shows the types of machines involved in the 45 accidents whilst freeing blockages on the machinery. A fifth of these accidents occurred on the Printing Presses (20%), followed by Conveyors (13%), Cutting machines (13%), and Folding machines (13%). Together these machines account for over half of the 45 accidents in this sample when freeing blockages.

3.6.1.2 Interventions with Machinery: Cleaning

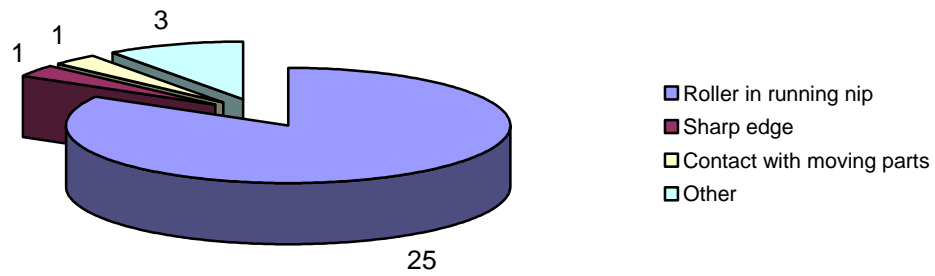


Figure 12 – ‘Cleaning’ Accidents by Cause (n = 30)

Figure 12 shows that the majority of the 30 cleaning accidents were caused by being drawn into the in-running nip of rollers (84%).

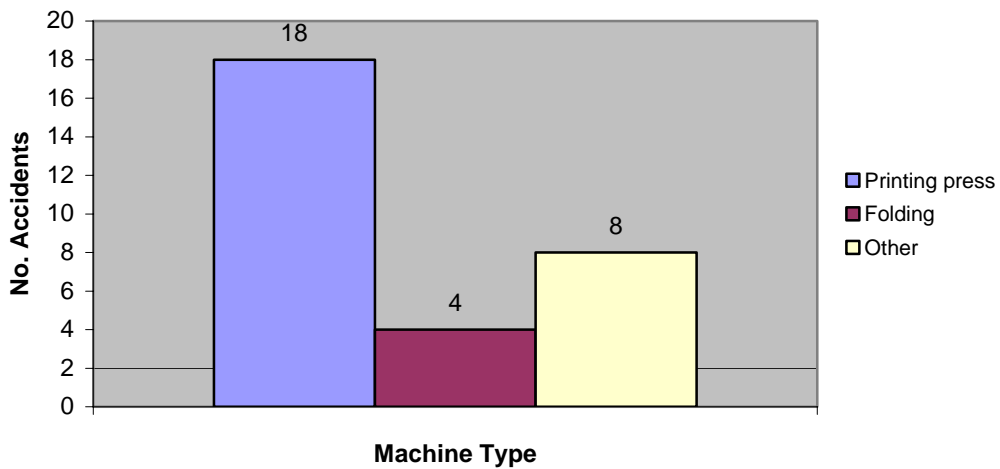


Figure 13 – ‘Cleaning’ Accidents by Machine Type (n = 30)

Figure 13 shows that from the 30 injuries sustained whilst cleaning machinery the majority of injuries involved Printing Presses (61%), followed by Folding machines (13%). This reflects that the Printing Press was involved in the most reported injuries as shown in figure 1.

3.6.1.3 Interventions with Machinery: Webbing-up.

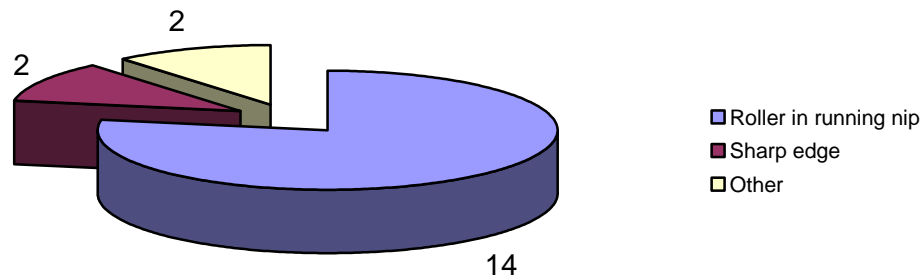


Figure 14 –‘Webbing-up’ Accidents by Cause (n = 18)

Figure 14 shows the causes of the 18 webbing-up accidents. Over three quarters of the accidents reported were caused by being drawn into the in-running nip of rollers (77%), with sharp edges and contact with moving parts responsible for a further 17% of accidents.

All of the 18 webbing-up accidents implicated the Printing Press.

3.6.1.4 Intervention with Machinery: Make-Ready

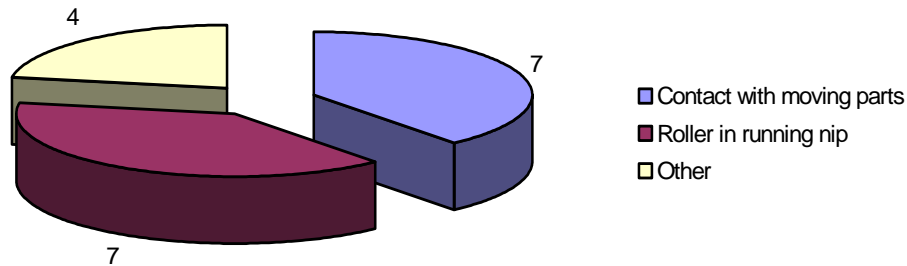


Figure 15 –‘Make-Ready’ Accidents by Cause (n = 18)

Figure 15 shows the types of machines most commonly involved in the 18 ‘make-ready’ accidents. Over three quarters (82%) of the make-ready accidents reported were caused by contact with moving parts or being drawn into the in-running nip of rollers.

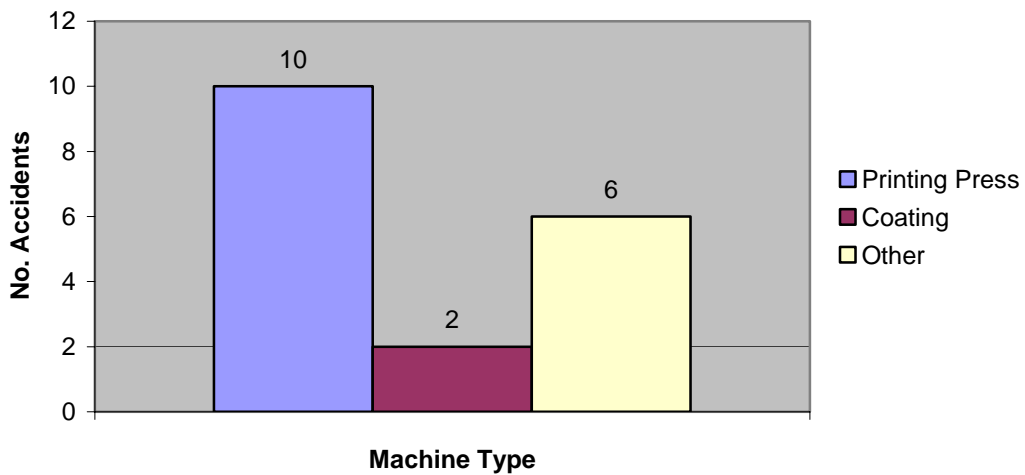


Figure 16 –‘Make-ready’ Accidents by Machine Type (n = 18)

Figure 16 shows the types of machines most commonly implicated in the 18 ‘make-ready’ accidents. Over half of the accidents implicated the Printing Press.

This is consistent with the frequency of make-ready activities involved with operating Printing Presses.

3.6.1.5 Intervention with Machinery: Maintenance

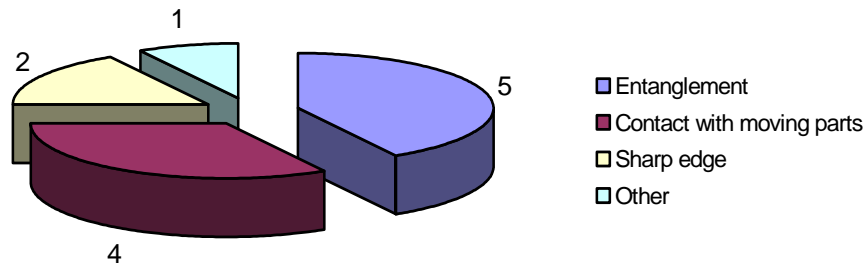


Figure 17 – ‘Maintenance’ Accidents by Cause (n = 12)

Figure 17 shows the causes of the 12 printing machinery accidents occurring during maintenance activities. Three quarters (75%) of the accidents reported were caused by either entanglement or contact with moving parts.

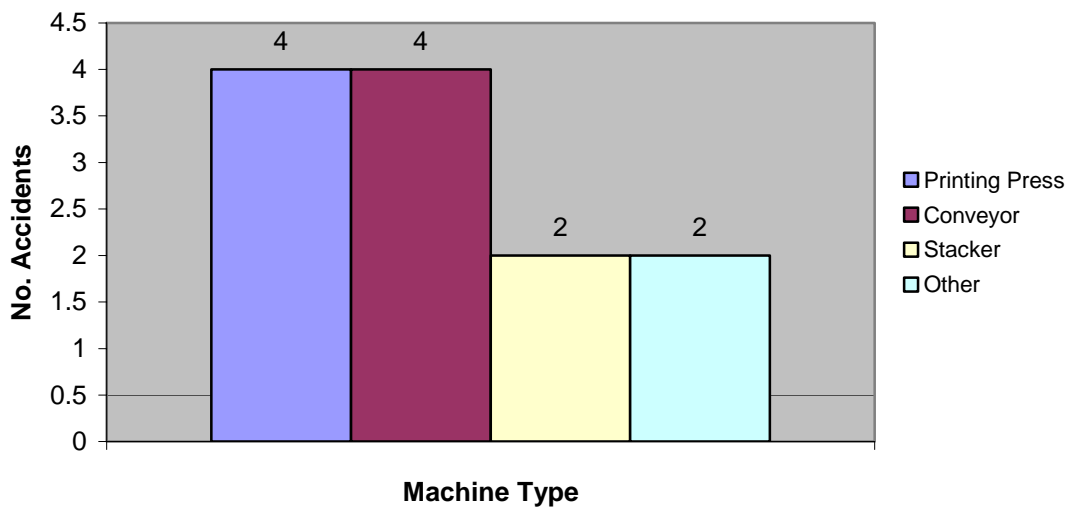


Figure 18 – ‘Maintenance’ Accidents by Machine Type (n = 12)

Figure 18 shows the types of machines implicated in the 12 ‘maintenance’ accidents. Over 80% (83%) of the accidents reported involved the Conveyor, Printing Press or Stacker.

3.6.2 Normal Operation

Initial analysis of the printing machinery accidents showed that following ‘intervention’ the second most common activity, when an accident occurred, was normal operations as shown in figure 6.

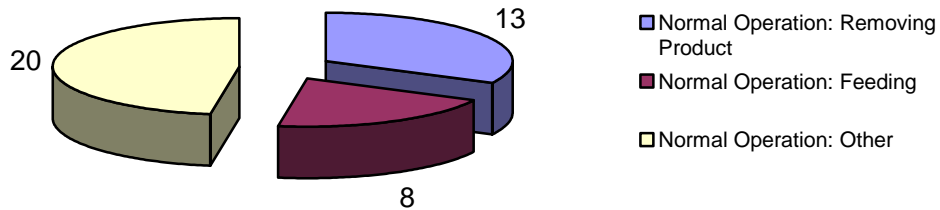


Figure 19 – ‘Normal Operation’ Accidents by Cause (n = 41)

Figure 19 shows the breakdown of the 41 accidents that occurred during normal operation of the machinery. 33% of the accidents occurred whilst removing the product and 20% whilst feeding the material.

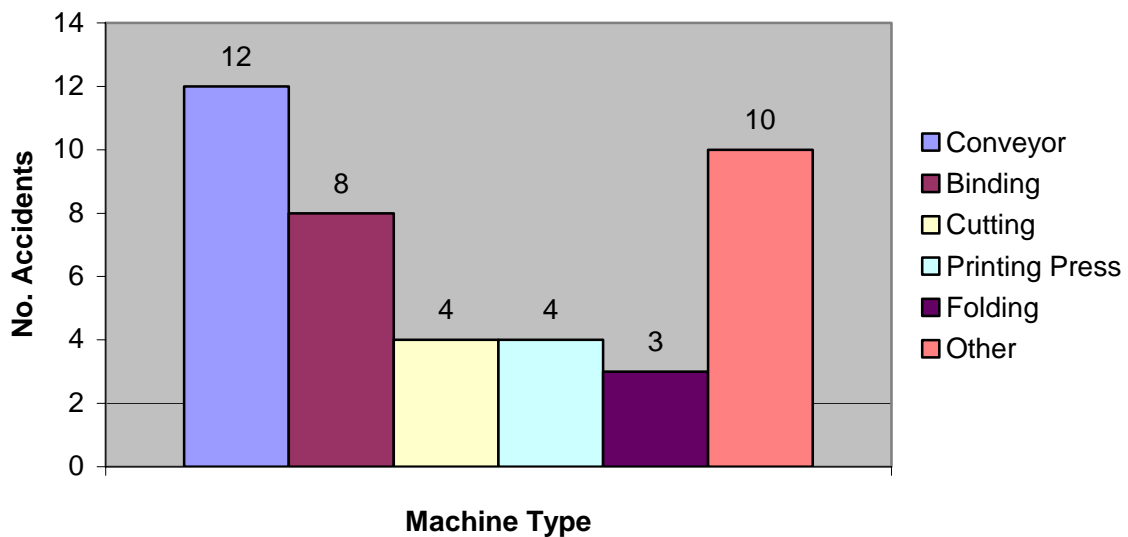


Figure 20 – ‘Normal Operation’ Accidents by Machine Type (n = 41)

Figure 20 shows the machines involved in the 41 accidents that occurred during normal operation of the machinery. Half of the accidents involved the Conveyor or the Binding machine.

4 DISCUSSION

The results of this analysis demonstrate that the most commonly implicated machine in the accidents reported under RIDDOR in 2003/04 was the Printing Press, followed by the Conveyor.

The most common causes of these accidents were being drawn into the in-running nip of rollers, contact with moving parts or entanglement with rotating parts.

Lacerations, superficial (i.e. cuts and bruises), and fractures or dislocations were the most commonly reported type of injury. The most commonly injured part of the body was the finger, followed by the hand. These findings are consistent with the frequency of manual work, involved in the Printing and Publishing industry, where the hands are in close proximity to moving parts of the machinery.

The majority of accidents occurred during an intervention, most commonly when freeing blockages in the machinery. This was followed by accidents during cleaning and webbing-up or making-ready.

Whilst this analysis is useful in determining common factors in the reported accidents, the small sample size encourages a degree of caution when considering the results in the context of the entire Printing and Publishing Industry.

5 CONCLUSIONS

The aim of this project was to analyse RIDDOR accidents, reported by the Printing and Publishing industry between 2003-2004 in order to gain a clearer picture of the factors that contribute to these accidents.

Through the course of the project RIDDOR accidents reported by the Printing and Publishing industry were identified and isolated. Despite a lack of adequate detail in some of the RIDDOR reports, useful information has been extracted from the reports for the purposes of this analysis.

6 FURTHER READING

Giraud, L., Masse, S., & Schreiber, L. (2004). Belt Conveyor Safety: Understanding the Hazards. In: *Professional Safety* (Pp 20-26).

Health and Safety Executive Website, Printing Section. Printing Industry figures. Retrieved March 20th, 2006 from <http://www.hse.gov.uk/printing/index.htm>

The Printers Guide to Health and Safety (2002). Health and Safety Commission and Printing Industry Advisory Committee. Second edition.

Revitalising Health and Safety Strategy Statement: A strategy for workplace health and safety in Great Britain to 2010 and beyond. Health and Safety Executive, June 2000.

A range of free health and safety material is available from HSE's Printing website: <http://www.hse.gov.uk/printing/machine/index.htm>