



**Testing and improving the usability of the
Manual handling Assessment Chart (MAC)**

Briony Care MSc¹, Chris Quarrie BSc¹ and Simon C Monnington BSc²

¹Better Working Environment Division, HSE

²Field Operations Directorate, HSE

CONTENTS

1	Introduction	1
1.1	Background	1
1.2	Criteria for the MAC	2
2	Methods	4
2.1	Introduction	4
2.2	Study aims	4
2.3	Study structure	4
3	Phase 1 questionnaire	5
3.1	Introduction	5
3.2	Questionnaire structure	5
4	Results from the Phase 1 questionnaire	7
4.1	Baseline information	7
4.2	The flowcharts	8
4.3	The aide memoire	9
4.4	Confidence in assessing manual handling activities	13
4.5	Further comments on the MAC	14
5	Conclusions from the Phase 1 questionnaire	15
5.1	Baseline information	15
5.2	The flow charts	15
5.3	The aide memoire	15
5.4	Levels of confidence	16
5.5	General findings	16
5.6	Recommendations for specific changes to the MAC	16
6	Phase 2: User feedback on changes made	18
6.1	Method	18
6.2	Results	18
6.3	Conclusion	18
7	Discussion	19
8	References	21
9	Appendix - the Phase 1 questionnaire	22

LIST OF TABLES

Table 1	Attendance at FOD ergonomics / MSD enforcement courses	7
Table 2	Number of manual handling enforcement notice issued by inspectors in the previous year	7
Table 3	Number of times in the previous year inspectors dealt with manual handling issues by giving advice to duty holders	8
Table 4	Ease of use of the separate tools	9
Table 5	Usefulness of the tools for identifying manual handling risk and increasing duty holder awareness	9
Table 6	Usefulness of the charts in helping inspectors meet the requirements of the Priority Programme in relation to manual handling	9
Table 7	Effectiveness of the aide memoire in fulfilling the given criteria	9
Table 8	Ease of identifying manual handling risk factors with the MAC	10
Table 9	Strengths and weaknesses of the aide memoire in assisting the identification of manual handling risk factors (a)	11
Table 10	Strengths and weaknesses of the aide memoire in assisting the identification of manual handling risk factors (b)	12
Table 11	Ease of scoring manual handling risk factors	12
Table 12	Strengths and weaknesses of the aide memoire in assisting the scoring of manual handling risk factors	13
Table 13	Effect of receiving the MAC on how confident inspectors felt in identifying and assessing manual handling risks	14
Table 14	Effect of receiving the MAC on how confident inspectors felt when making manual handling enforcement decisions	14
Table 15	Final comments and suggestions from inspectors regarding the MAC	14
Table 16	Comments and recommendations made by the user panel and subsequent actions	17
Table 17	Comments received from the user panel in response to receiving the revised version of the MAC	18

LIST OF FIGURES

Figure 1	The colour coded risk classification used in the MAC	3
----------	--	---

EXECUTIVE SUMMARY

OBJECTIVES

Ergonomists at the Health and Safety Executive (HSE) and the Health and Safety Laboratory (HSL) have developed a Manual Handling Assessment Chart (MAC). The aim of the MAC is to help reduce the prevalence of musculoskeletal ill health by providing health and safety inspectors with a tool to assist the recognition of high-risk manual handling tasks and therefore to assist them to meet HSE's targets for reducing musculoskeletal ill health.

The aim of this project was to identify the strengths and weaknesses of the preliminary versions of the MAC and produce a set of recommendations to be implemented before the MAC was released to all HSE and Local Authority (LA) inspectors of health and safety.

The end users, HSE and (LA) inspectors assisted with the usability assessment. Inspectors were provided with training in how to use the MAC and asked to use the charts during their inspection duties over a 2-month period. They were then asked to complete the usability study questionnaire.

The usability study consisted of two phases:

Phase 1 involved distributing a questionnaire that asked users to provide information regarding their experience of using the MAC when performing inspection duties. From the results of Phase 1 a set of recommendations on how to improve the MAC were extrapolated and appropriate changes made.

Phase 2 involved a second questionnaire and assessed the acceptance of the changes made to the tool ensuring these were an improvement.

MAIN FINDINGS

The usability study has met its aims of identifying the strengths and weaknesses of the draft MAC. A set of recommendations were successfully extrapolated from users' comments and incorporated by the development team into the tool. The potential users accepted the changes made to the MAC. In addition, the future success of the MAC was gauged as inspectors were asked how their confidence in making manual handling assessments has changed after receiving and using the MAC, and how it will assist them in meeting the targets of HSE's Musculoskeletal Disorders Priority Programme.

CONCLUSIONS

It is concluded that the developed tool is highly usable and accepted by both HSE and LA inspectors. The MAC is sufficient and robust enough for inspectors to assess manual handling risks in most situations. All components of the tool were found to be easy to use, and useful in identifying manual handling risk and for increasing duty holders' awareness. More importantly after receiving the MAC inspectors have become more confident in assessing manual handling risk and making manual handling enforcement decisions. Therefore, the outcome of the study was the development of an extremely usable manual handling assessment tool that was distributed to all HSE and LA inspectors.

1 INTRODUCTION

1.1 BACKGROUND

Musculoskeletal disorders (MSDs) are the most common form of work-related illness in Great Britain. In 1995 it was estimated that around 1.2 million people in Great Britain were suffering from an MSD caused by work, accounting for about 60% of all reported cases of occupational ill health (Jones and Hodgson, 1998). About 180,000 new cases of work-related MSDs (WRMSDs) occur each year. It is estimated that this results in 9.9 million working days lost, at a cost to society of about £5.7 billion (1995/96 prices).

In October 2001 the Health and Safety Commission (HSC) published its strategic plan for 2001/04. This is aimed at delivering the targets that are set out in the occupational health strategy, *Securing Health Together (SH2)* (HSE 2000a) and in the Government's *Revitalising Health and Safety (RHS)* (HSC, 2000b) initiative. The HSC's plan contains a number of Priority Programmes, including one on MSDs (the MSD PP). By doing this, the HSC acknowledged that it would be essential to tackle MSDs in order to achieve the overall *SH2* occupational health targets.

The MSDs PP contains the following targets specifically for MSDs:

- To reduce the incidence of work related illness caused by MSDs by 12% by 2004, and 20% by 2010; and
- To reduce the number of working days lost due to MSDs by 15% by 2004, and 30% by 2010.

Manual handling is a very common workplace activity. It has been defined as 'any transporting or supporting of a load (including the lifting, putting down, pushing, pulling carrying or moving thereof) by hand or bodily force' (HSE, 1998).

According to the figures from the 1995 Self-reported Work Illness survey (Jones and Hodgson, 1998), of those respondents who reported musculoskeletal problems, 52% believed that it was manual handling activities that caused their ailment.

The Ergonomics Section of HSL was commissioned in April 2000 by the Human Factors Unit of HSE's Health Directorate to examine the feasibility of providing HSE inspectors with an existing manual handling risk assessment tool or of producing a new tool.

As a result of an analysis of existing tools, the decision was made to develop a new tool targeted at inspectors. A report by Monnington *et al.* (2002) outlines the work on the new tool (the Manual handling Assessment Charts, or MAC) up to its formal release to HSE and Local Authority (LA) inspectors in November 2002 (HSE, 2002). Reliability testing of the tool is reported by Tapley (2002) and benchmarking of the charts against other tools is reported by Pinder (2002).

1.2 CRITERIA FOR THE MAC

A user-friendly, tool was needed that would help health and safety inspectors visiting workplaces quickly to identify the key risk factors associated with manual handling with ease and confidence. This would enable them to make an initial appraisal of the work activities and determine the extent to which employers were managing manual handling risks under the 1992 Manual Handling Operations Regulations (HSE, 1998).

A project team was set up which included ergonomists in HSE's Health Directorate, Health and Safety Laboratory (HSL), Field Operations Directorate (FOD) and Local Authority Unit (LAU) collaborating to develop such a tool. It was decided to create a tool that would focus on common manual handling activities, such as lifting, carrying and team handling of inanimate objects. It was decided to exclude a risk assessment tool for pushing and pulling tasks, because of the lack of data on which one could be based. Tasks involving handling of people or animals were also excluded because of the additional factors that need to be considered.

A specification was drawn up requiring that the MAC should be:

- Based on traceable ergonomics guidelines or published studies;
- Quick, accurate and easy to use;
- Capable of identifying and ranking key risk factors;
- Able to provide consistent and reliable ratings
- Able to indicate when specialist support was needed;
- Able to indicate where good manual handling practice existed.

A number of existing ergonomics tools were considered but none fully met these requirements.

Initial focus group meetings with HSE inspectors indicated that a flow chart approach would be most likely to meet the specification. Early trials showed that, with this approach, users were able to obtain consistent scores with minimal training. Further trials resulted in improvements to the layout and scoring system and led to the development of three charts covering;

- Lifting operations,
- Carrying operations, and
- Team handling operations.

All three charts follow a similar approach, requiring the inspector to rank manual handling risk factors against 'green', 'amber', 'red' or 'purple' criteria. The colour bands give an indication of the level of risk and are designed to be consistent with the HSE guidance on the 1992 Manual Handling Operations Regulations (HSE, 1998). The load-frequency relationships used in the charts derives from the psychophysical studies of manual handling performed by Snook and Ciriello (1991). The criteria selected for assessing which risk category each risk factor should be assigned to are defined in Table 1:

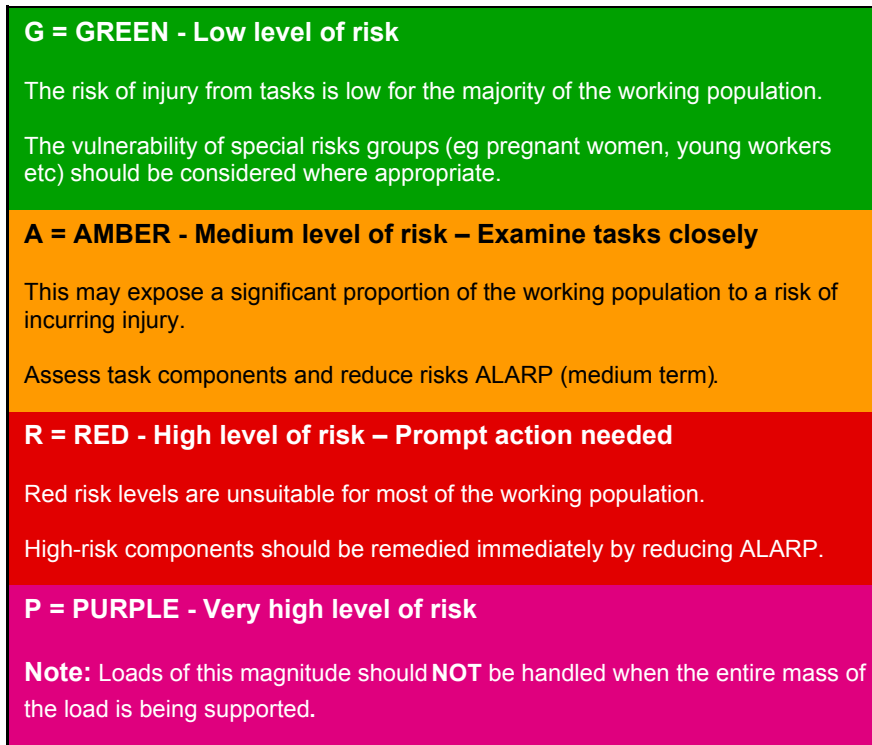


Figure 1 The colour coded risk classification used in the MAC

Each flow chart requires the user to work through a sequence of risk factors commencing with load and lifting/carrying frequency. For the lifting chart, the position of the hands in relation to the trunk, the vertical lift distance, the degree of twisting, postural constraints, the quality of the grip on the load, floor conditions and other environmental factors are then considered in turn. Individual factors such as age, physical fitness and strength are not included on the chart but are considered in the application of the criteria and can be recorded on the scoring sheet. A colour band and numerical score are allocated for each risk factor and the latter are aggregated to give a cumulative risk ranking score, which could be used as a comparative measure of risk.

The charts were designed as quick risk assessment tools to assist in identifying high-risk activities. Purple or red scores for any risk factor are generally considered to be indicative of a high risk of injury needing prompt action to reduce the risk. For amber scores a more detailed assessment will usually be necessary looking at the scope for reducing the overall risk. Task components with green scores cannot be assumed to be entirely free from risk and should be monitored as part of an ongoing management programme.

The tool can be used in an interactive way to explore risk control options by looking at the effects of changes in the ratings for task components.

2 METHODS

2.1 INTRODUCTION

Usability has been defined by Shackel, (1991) as:

“the capability in human functional terms to be used easily and effectively by the specified range of users, given specified training and user support, to fulfil the specified range of tasks, within the specified range of environmental scenarios.”

In this instance, the users are HSE and LA health and safety inspectors. The charts are to be used by them in fulfilling their inspection duties by assisting them to assess manual handling activities. There was a requirement in the design of the MAC that the need for training in its use should be kept to a minimum to reduce costs and allow for prompt use. There was also a requirement that the need for specialist assistance in making enforcement decisions should be minimal.

2.2 STUDY AIMS

The aims of the usability study were:

- (1) To identify the strengths and weaknesses of the MAC when used by HSE and LA inspectors;
- (2) To extrapolate a set of recommendations to be fed into the tool’s development; and
- (3) To obtain feedback from inspectors on the changes made to the tool.

2.3 STUDY STRUCTURE

In order to meet Aim (1), a paper questionnaire (Appendix 1) was distributed with a revised version of the MAC in a notebook size format. Recipients were asked to provide information regarding their experience of using the MAC in inspection over a two month period. In addition, a telephone line and email account were set-up to provide assistance to users if needed and to feedback additional information to the project team.

The results obtained from this questionnaire were used to meet Aim (2) by extrapolating a set of recommendations on how to improve the MAC and making appropriate changes.

In order to meet Aim (3), a second questionnaire assessed users’ responses to the changes made as a result of the first questionnaire. Once this had been completed, the revised version of the MAC (HSE, 2002) was distributed to all HSE and LA inspectors in November 2002.

3 PHASE 1 QUESTIONNAIRE

3.1 INTRODUCTION

In May 2001, 15 HSE inspectors, five of whom were 'Nominated Persons in Ergonomics' (NPEs) were trained to use the MAC. NPEs have the responsibility of providing basic assistance to other HSE inspectors over issues involving ergonomics. Depending upon the advice required, NPEs would either attempt to address the problems themselves or direct the inspectors to other sources of assistance such as specialist ergonomists in

NPEs were asked to carry out cascade training to inspectors in their respective areas and to encourage the use of the tools when making manual handling inspections over the following two months. It was estimated that approximately 80% of all inspectors were consequently trained or received an introduction and familiarisation session to use the MAC when on inspection duties.

Once the HSE inspectors had been trained, 10 LA inspectors were trained to use the MAC.

The project team thought it imperative to involve the end user as much as possible throughout the project. All persons using the MAC were made aware of the dedicated telephone help line and email account that had been set up for them to use should they wish to obtain any further information. They were also made aware that the MAC they were using was a draft copy for the usability trial and they were encouraged to comment on their experiences of using it.

A questionnaire was chosen as the method to assess usability. It enabled inspectors to consider the questions while using the charts. The questions were constructed to allow completion also by inspectors who had not been able to use the charts on inspection duties, but whose expert opinion was regarded as relevant to the tool's evaluation and development.

The questionnaires were distributed to a range of users of the MAC:

- Experienced and trainee inspectors in HSE's Field Operations Division (FOD);
- Medical and occupational health inspectors in HSE's Employment Medical Advisory Service (EMAS);
- Environmental Health Officers employed by Local Authorities (LA).

The questionnaires were distributed by post in early 2002 along with a revision of the version of the MAC issued in May 2001 as an 'A5 notebook' size booklet. Participants were asked to return completed questionnaires in the addressed envelopes after the two-month trial period.

3.2 QUESTIONNAIRE STRUCTURE

The content of the questionnaire is reproduced in Appendix 1. It consisted of the following sections:

3.2.1 Baseline information

The aim of the baseline section of the questionnaire was to obtain information regarding the general background and experience of the inspector, and their training, knowledge, experience, history and confidence in addressing manual handling issues. Therefore, it asked questions about the length of time employed as an inspector, their experiences of issuing improvement notices/prohibition notices relating to manual handling issues and their confidence in dealing with manual handling issues both prior to and after receiving the MAC. It also provided information as to whether the user group was an adequate representation of inspectors throughout the organisation.

3.2.2 Process of using the MAC

This section assessed users' perceptions on how easy they found the charts to use when identifying and assessing manual handling risks. Users were asked to rate the ease of use on a five point Likert scale, ranging from 'Very easy' to 'Very difficult' to use. Importantly, it asked inspectors to assess whether they thought the tool would help them meet the requirements of HSE's Priority Programme on musculoskeletal disorders.

3.2.3 The aide memoire

The aide memoire is a set of instructions and advice that complements the three charts in the booklet. In the assessment of the aide memoire, users were asked to assess how useful it was in:

- Providing a brief description of the risk factors in the MAC
- Assisting with scoring the manual handling task
- Promoting familiarity with risks. i.e. can recall from memory

The questions were designed to determine the strengths and weaknesses of identifying and assessing each manual handling risk. Users were asked to rate the ease of identifying and scoring manual handling risk using the chart on a 5-point Likert scale. Again, this ranged from 'Very easy' to 'Very difficult'. The aim was to highlight where improvements could be made.

For risk factors considered by the development team as difficult to assess, users were asked how easy the aide memoire and tool made identifying the presence of the risk. Risk factors considered easy to identify (such as a wet floor), were assessed on how easy users found the aide memoire and tool made scoring the risk factor.

3.2.4 Confidence of inspectors when tackling manual handling

Section 4 assessed users' perceived confidence in identifying and assessing manual handling risk. This was both before and after receiving and using the tool. This section acted as a preliminary assessment to predict the future success of the charts. Finally, users were asked to make additional comments regarding format and general layout of the MAC.

4 RESULTS FROM THE PHASE 1 QUESTIONNAIRE

4.1 BASELINE INFORMATION

Of the 26 questionnaires distributed across a range of representative users, 25 were returned, with 15 being from HSE inspectors and 10 from LA inspectors.

The HSE inspectors had worked for HSE for between 6 months and 32 years, with a median of 11 years. Thirteen of the fifteen had attended the ergonomics and/or musculoskeletal disorders enforcement courses run for FOD inspectors. Six had attended in the previous year, one two to three years previously, and two between four to five years previously. Three had attended such a course six to seven years previously and for one it was between eight to nine years previously (Table 1).

Table 1 Attendance at FOD ergonomics / MSD enforcement courses

<i>Years prior</i>	<i>0-1</i>	<i>2-3</i>	<i>4-5</i>	<i>6-7</i>	<i>8-9</i>	<i>Not attended</i>
<i>HSE inspectors</i>	6	1	2	3	1	2

Of all respondents, 13 had received other training in ergonomics and related topics. The other training courses included:

- Regional musculoskeletal enforcement training;
- A two week course in ergonomics/ human factors at Nottingham University as provided for the original seven Intelligent Customers in Ergonomics (now known as NPEs);
- Ergonomics as part of undergraduate and postgraduate courses;
- Employment Medical Advisory Service (EMAS) conferences.

Of all 25 HSE and LA inspector respondents, 13 had not issued an enforcement notice concerning manual handling in the previous calendar year (Table 2). Of these, nine were LA inspectors and four HSE inspectors. Comparatively, ten HSE and one LA inspectors had last issued an enforcement notice concerning manual handling between one and five years previously. One HSE inspector had last issued an enforcement notice concerning manual handling between six and 10 years before completing the questionnaire.

Table 2 Number of manual handling enforcement notice issued by inspectors in the previous year

	<i>0 notices</i>	<i>1-5 notices</i>	<i>6-10 notices</i>	<i>> 10 notices</i>
<i>HSE inspectors</i>	4 (27%)	10 (67%)	1 (7%)	
<i>LA inspectors</i>	9 (90%)	1 (10%)		
<i>All inspectors</i>	13 (52%)	11 (44%)	1 (4%)	

Only three inspectors, all HSE inspectors, stated they had required specialist support to issue enforcement notices regarding manual handling. Two had required a visit by a specialist and one required a telephone call only.

Of both HSE and LA inspectors, 21 reported not taking or preparing any prosecution cases concerning manual handling in the last calendar year. One HSE inspector and one LA inspector reported that they had taken or are preparing manual handling prosecution cases. One HSE inspector said he was currently dealing with two potential manual handling prosecution cases.

The total number of times in the last calendar year both the HSE and LA inspectors had dealt with manual handling by giving advice (verbal or letter) rather than formal enforcement action, was also assessed (Table 3). Seven inspectors reported having dealt with manual handling problem by giving advice on 1-5 occasions, seven inspectors on 6-10 occasions and eleven on more than 10 occasions. When giving the advice, seven inspectors reported they needed specialist support 1-5 times requiring a visit and four times requiring a phone call only. The distribution of these results was similar for the HSE and LA inspectors. Only one HSE inspector required specialist support in the form of a phone call on 6-10 occasions.

Table 3 Number of times in the previous year inspectors dealt with manual handling issues by giving advice to duty holders

	<i>0 times</i>	<i>1-5 times</i>	<i>6-10 times</i>	<i>> 10 times</i>
<i>HSE inspectors</i>		4 (27%)	5 (33%)	6 (40%)
<i>LA inspectors</i>		3 (30%)	2 (20%)	5 (50%)
<i>All inspectors</i>		7 (28%)	7 (28%)	11 (44%)

4.2 THE FLOWCHARTS

Of the 25 inspectors who completed the questionnaire, 22 had found the opportunity to use MAC in the previous two months. The three inspectors who had not used the charts all worked for HSE. They attributed other work pressures and the nature of their work as reasons for failing to use the MAC.

There was also comment by one HSE inspector that there was no need to use the flow charts on every occasion as the risk factors became memorised.

Between the HSE and LA inspectors, the lifting tool was used a total of 71 times over the two month trial period. The team handling tool was used a total of 21 times and the carrying tool a total of 37 times. Inspectors who had not yet used the tool but had attended training were asked to draw on their inspecting experience to predict how useful the tool would be. Despite this, not all inspectors completed these sections of the questionnaire

The majority of inspectors rated each tool as *Easy* or *Very easy* to use as a method to identify key manual handling risks and to increase duty holder awareness (Table 4). The carrying tool was the only one to be given *Difficult to use* ratings; this was by three LA inspectors.

All inspectors rated the tools as either *Very useful* or *Useful* as a method to identify manual handling risks and increase duty holder awareness (Table 5).

Table 4 Ease of use of the separate tools

	<i>Very easy</i>	<i>Easy</i>	<i>Neither easy nor difficult</i>	<i>Difficult</i>	<i>Very difficult</i>	<i>No answer</i>
<i>Lifting</i>	7 (30%)	11 (48%)	5 (22%)			2
<i>Team handling</i>	4 (27%)	5 (33%)	6 (40%)			10
<i>Carrying</i>	6 (35%)	6 (35%)	2 (12%)	3 (18%)		8

Table 5 Usefulness of the tools for identifying manual handling risk and increasing duty holder awareness

	<i>Very useful</i>	<i>Useful</i>	<i>Neither</i>	<i>Limited use</i>	<i>No use</i>	<i>No answer</i>
<i>Lifting</i>	8 (35%)	15 (65%)				2
<i>Team handling</i>	6 (38%)	10 (63%)				9
<i>Carrying</i>	8 (44%)	10 (56%)				7

Table 6 details the inspectors' ratings of the use of the chart in helping meet the requirements of the Priority Programme in relation to manual handling. All responses were that the charts either were *Very useful* or *Useful* towards helping meet the aims of the Priority Programme.

Table 6 Usefulness of the charts in helping inspectors meet the requirements of the Priority Programme in relation to manual handling

	<i>Very useful</i>	<i>Useful</i>	<i>Neither</i>	<i>Limited use</i>	<i>No use</i>	<i>No answer</i>
<i>All inspectors</i>	7 (29%)	17 (71%)				1

4.3 THE AIDE MEMOIRE

Section 3 of the questionnaire determined how effective the aide memoire was in fulfilling the following criteria. All respondents rated the aide memoire as either *Very effective* or *Effective* in fulfilling them (Table 7).

- Providing a brief description of the risk factors of the MAC;
- Assisting with scoring the manual handling task;
- Promoting familiarity with risks, i.e., so they can be recalled from memory.

Table 7 Effectiveness of the aide memoire in fulfilling the given criteria

	<i>Very Effective</i>	<i>Effective</i>	<i>Neither</i>	<i>Not Effective</i>	<i>Not at all Effective</i>	<i>No answer</i>
<i>HSE inspectors</i>	1 (7%)	13 (93%)				1
<i>LA inspectors</i>	4 (40%)	6 (60%)				0
<i>All inspectors</i>	5 (21%)	19 (79%)				1

Inspectors were asked to rate how easy they found *identifying* certain manual handling risk factors and to specify any strengths and weaknesses of the aide memoire. From experience, it was assumed that *Floor surface, Environmental factors, Carrying distance, Obstacles en route* and *Communication and co-ordination* would be easy to identify and problems might only be found with the scoring. Overall, inspectors found the manual handling risk factors easy to identify. Risk factors found less easy to identify by some were the *Load weight, Hand distance from low back, Trunk twisting/ sideways bending* and *Grip on load*. One inspector rated the risk factor *Hand distance from low back* as very difficult to identify (Table 8).

Table 8 Ease of identifying manual handling risk factors with the MAC

	<i>Very easy to identify</i>	<i>Easy to identify</i>	<i>Fairly easy to identify</i>	<i>Not very easy to identify</i>	<i>Very difficult to identify</i>	<i>No answer</i>
<i>Load weight (all tools)</i>	2 (8%)	9 (38%)	10 (42%)	3 (13%)		1
<i>Hand distance from low back (all tools)</i>	2 (9%)	8 (35%)	9 (39%)	3 (13%)	1 (4%)	2
<i>Vertical lift distance (lifting / team handling)</i>	6 (25%)	18 (75%)				1
<i>Trunk twisting / sideways bending (lifting / team handling tools)</i>	2 (8%)	13 (54%)	8 (33%)	1 (4%)		1
<i>Postural constraints (all tools)</i>	6 (25%)	11 (46%)	7 (29%)			1
<i>Grip on load (all tools)</i>	2 (8%)	10 (42%)	11 (46%)	1 (4%)		1
<i>Asymmetrical trunk (carrying tool)</i>	2 (10%)	8 (38%)	11 (52%)			4

After rating the ease of identifying these manual handling risk factor, the inspectors were asked to specify what they believed to be the strengths and weaknesses of the aide memoire in relation to each MAC risk factor. A summary of these points is presented in Tables 9 and 10.

Table 9 Strengths and weaknesses of the aide memoire in assisting the identification of manual handling risk factors (a)

<i>Strengths</i>	<i>Weaknesses</i>
<i>Load weight / frequency of lift / carry (all tools)</i>	
<ul style="list-style-type: none"> • Colour coding is effective when demonstrating the risk to the proprietor. • Tool is less bulky than previous prototype. • User friendly. • Considerably easier with subsequent use. • Use of number of lifts both in number and time for lifts per hour good to use. 	<ul style="list-style-type: none"> • Can be difficult to gauge the weight of loads. • Some problems working out repetition rates. • Maybe improved with gridlines over graph. • Difficult to assess when on borderline. • Lower weights at high frequency give a ‘green’ score. This is not necessarily the case considering other risk factors.
<i>Hand distance from low back (all tools)</i>	
<ul style="list-style-type: none"> • Very clear and fairly straight forward to understand. • Can show operative pictures and ask them to pinpoint their lifting technique. • Pictures are very useful. 	<ul style="list-style-type: none"> • It would be less confusing to quote distances of hands from spine in horizontal plane rather than ‘upper arms angled away from body’. • Found some postures which weren’t illustrated, there are no ready options for situations differing from guidance ratings. Range not extensive enough. • More diagrams would be useful. • Difficult to identify correct category with a pushing task. • Difficult to differentiate in practice A3/R6 due to quick activity.
<i>Vertical lift distance (lifting / team handling tools)</i>	
<ul style="list-style-type: none"> • Is fairly straightforward to understand. • Examples/ scenarios written are excellent. • Excellent illustration, easily identifiable. 	<ul style="list-style-type: none"> • Need a box marked R/2 showing lifting from floor to knees/ waist level. • No amber/ intermediate risk levels. • What about lifts from waist to shoulder height? Can’t believe this should get G/0 or R/3.
<i>Trunk twisting/ sideways bending (lifting / team handling tools)</i>	
<ul style="list-style-type: none"> • Not a problem, easy to identify. • Fairly easy to identify. 	<ul style="list-style-type: none"> • Any confusion in the aide memoire is made very clear in the flow charts. • With regular and repetitive work this can be fairly easy to identify; however with one-off movements it can sometimes be difficult to judge correctly every turn. • Other posture factors need to be considered. • Harder to identify in team handling.
<i>Postural constraints (all tools)</i>	
<ul style="list-style-type: none"> • Straight forward. • Both aide memoire and flow charts make it very easy to understand. 	<ul style="list-style-type: none"> • The notes are not very clear on very poor postural constraints – the guidance only says ‘if posture is heavily restricted’ – the colour band is red, this could be expanded. • No category for confined spaces/low head room. • Activity can result in different twists/movement depending on height of person.

Table 10 Strengths and weaknesses of the aide memoire in assisting the identification of manual handling risk factors (b)

<i>Strengths</i>	<i>Weaknesses</i>
<i>Grip on load (all tools)</i>	
<ul style="list-style-type: none"> Well explained. 	<ul style="list-style-type: none"> Sometimes grip falls between good - reasonable and reasonable - poor. Can't understand what non-rigid sacks or animate objects mean. Scope for debate with real life loads. Can sometimes be difficult to decide what constitutes a good/bad grip. May be more useful to have an illustration showing proper position of the load. 'Reasonable' is open to interpretation. Some packages difficult to assess grip method and most appropriate task.
<i>Asymmetrical trunk (carrying tool)</i>	
<ul style="list-style-type: none"> The diagrams are helpful. 	<ul style="list-style-type: none"> May be difficult to identify for complex (shaped) object. Tool box is not a very good example May be useful to have a picture of one-handed carry.

The inspectors were also asked to rate how easy they found *scoring* the remaining manual handling risk factors of the MAC (Table 11).

Table 11 Ease of scoring manual handling risk factors

	<i>Very easy to score</i>	<i>Easy to score</i>	<i>Fairly easy to score</i>	<i>Not very easy to score</i>	<i>Very difficult to score</i>	<i>No answer</i>
<i>Floor surface</i>	4 (17%)	18 (75%)	2 (8%)			1
<i>Environmental factors</i>	2 (8%)	11 (46%)	7 (29%)	4 (17%)		1
<i>Carrying distance</i>	5 (22%)	17 (74%)		1 (4%)		2
<i>Obstacles en route</i>	5 (29%)	12 (71%)				8
<i>Communication and co-ordination</i>	2 (11%)	6 (33%)	7 (39%)	3 (17%)		7

Overall, inspectors found these risk factors easy to score and none found scoring any factor *Very difficult*. Some inspectors found *Environmental conditions*, *Carrying distance* and *Communication and co-ordination* difficult to score. Table 12 lists the specific comments made on the strengths and weaknesses of these factors.

Table 12 Strengths and weaknesses of the aide memoire in assisting the scoring of manual handling risk factors

<i>Strengths</i>	<i>Weaknesses</i>
<i>Floor surface</i>	
<ul style="list-style-type: none"> • Straightforward, no problems. • Easy to understand from descriptions 	<ul style="list-style-type: none"> • Not very straightforward to assess on a construction site, where ground is always wet, muddy or uneven. • Used worse case scenario.
<i>Other environmental factors</i>	
<ul style="list-style-type: none"> • Extremes of good and bad are straightforward. 	<ul style="list-style-type: none"> • Difficult on a construction site, as weather constantly changing. • What score should be given if two environmental factors are present? • Found it difficult to award an ‘extreme score’. • Is time of year taken into consideration? • Need to include weather.
<i>Carrying distance</i>	
<ul style="list-style-type: none"> • Straightforward • Very clear 	<ul style="list-style-type: none"> • Needs more clarity.
<i>Obstacles en route</i>	
<ul style="list-style-type: none"> • Aide memoire and chart details are clear. 	<ul style="list-style-type: none"> • Need to consider space restrictions. • If two risk factors are present does the result remain amber or does it become red? • Need to include reduced head height? • May need to consider doors.
<i>Communication and coordination</i>	
<ul style="list-style-type: none"> • Straightforward • Aide memoire is very clear. 	<ul style="list-style-type: none"> • Can be difficult if the lifting team have a set of routine based non-verbal signals. • Some examples of good and bad communication would be helpful. • There is greater degree of subjectivity in scoring this parameter than any of the others. • Depends on how long people have been working on the job and with each other. • Difficult to ascertain if movement wasn’t carried out at time of assessment.

Inspectors were asked whether there were any manual handling situations where they felt the tool was not sufficiently robust or suitable to fully assess the risk. Situations identified included: people handling; some limitations when assessing tasks involving the manipulation of tools, for example hand mixing of foods such as coleslaw in eurobins; and when carrying and team lifting above head height. The general feedback was that inspectors found the MAC sufficiently robust and suitable to assess risk in most manual handling situations.

4.4 CONFIDENCE IN ASSESSING MANUAL HANDLING ACTIVITIES

The overall aim of the questionnaire was to assess the likely success of the MAC. Therefore, inspectors were asked to rate how confident they felt about assessing and identifying manual handling risk both before and after receiving the MAC. Table 13 illustrates the positive shift in

confidence level from an average of *Fairly confident* prior to receiving the MAC to *Very confident* having received and used the MAC. A similar positive shift of confidence was found with inspectors' ratings regarding making manual handling enforcement decisions (Table 14).

Table 13 Effect of receiving the MAC on how confident inspectors felt in identifying and assessing manual handling risks

	<i>Completely</i>	<i>Very</i>	<i>Fairly</i>	<i>A little</i>	<i>Not at all</i>	<i>No answer</i>
<i>Before MAC</i>		2 (8%)	16 (67%)	6 (25%)		1
<i>After MAC</i>	3 (12.5%)	15 (62.5%)	6 (25%)			1

Table 14 Effect of receiving the MAC on how confident inspectors felt when making manual handling enforcement decisions

	<i>Completely</i>	<i>Very</i>	<i>Fairly</i>	<i>A little</i>	<i>Not at all</i>	<i>No answer</i>
<i>Before MAC</i>		6 (25%)	13 (54%)	5 (20%)		1
<i>After MAC</i>	2 (8%)	11(46%)	11 (46%)			1

Respondents reported that they would use MAC as part of both proactive inspection and RIDDOR investigations (HSE, 1999)). The majority of respondents preferred the pocket book size chart to the original A4 sized charts. Comment was made that the smaller booklet fits well into the inspector's pocket so is easy to carry and refer to on inspections.

4.5 FURTHER COMMENTS ON THE MAC

Finally, the usability questionnaire asked inspectors to make any further comments regarding the MAC, particularly the layout and format, and to suggest modifications. These are listed in Table 15.

Table 15 Final comments and suggestions from inspectors regarding the MAC

- Concerned from feedback from operations colleagues that they wish the tool to be made more definitive. Emphasis must be given that the tool is to assist the process.
- Sometimes it was necessary to 'break down' a lifting operation in order to apply/ use the MAC.
- Inspectors wanted the final score to be more meaningful.
- Overall layout and format is excellent, but scoring system should tie in to enable appropriate enforcement action to be taken easily by an inspector.
- Fantastic, can we have something similar for W.R.U.L.D.s?
- Indication of high scores as problem areas.
- The categorisation of the tasks into colours is straightforward and provides a useful aide memoire however numerical scoring is confusing, as it doesn't achieve anything. I find the MAC useful in providing a framework for assessment of manual handling tasks but the overlap with W.R.U.L.D from repetitive tasks is not clear and can lead inspectors to miss W.R.U.L.D.s issues.
- MAC gives more confidence in assessing the levels of risk but does not offer solutions. It does not make inspectors 'experts' or reduce the need for expert witness evidence/ support if enforcement action is required.

5 CONCLUSIONS FROM THE PHASE 1 QUESTIONNAIRE

5.1 BASELINE INFORMATION

It was important to assess the usability of the tool for inspectors who had little experience of inspecting as well as those with many years of experience. It was established that the sample had a good range of years of experience working for HSE.

The results supported current impressions that very few manual handling enforcement notices were being issued. This is despite musculoskeletal disorders being the most common work-related ailment afflicting the general working population in the UK.

LA inspectors responding had issued more enforcement notices concerning manual handling in the previous year than HSE inspectors. However, the majority of enforcement notices issued in the previous 1-5 years were by HSE inspectors.

Finally most manual handling problems were dealt with by the provision of advice both verbal and written e.g., by letter.

5.2 THE FLOW CHARTS

Most inspectors had found the opportunity to use the booklet version of the MAC during the two months after receiving it. Of the three tools of the MAC, the lifting tool was used the most.

Feedback regarding the general use of the tool was very positive. All tools were found to be either very easy, easy or neither easy or difficult to use. Only the carrying tool was reported by a few inspectors to be difficult to use.

Feedback from how useful the tools were in identifying manual handling risk and increasing duty holder awareness was also very positive. All inspectors rated all three tools as either very useful or useful when identifying manual handling risk.

All inspectors reported the MAC as very useful or useful in helping them meet the requirements of HSE's Musculoskeletal Disorders Priority Programme.

Section 2 of the questionnaire established that although this draft of the MAC was very easy to use, there were areas where improvements could be made. Section 3 of the questionnaire addressed this issue with the aim of identifying specific limitations to be addressed.

5.3 THE AIDE MEMOIRE

Overall inspectors rated each manual handling risk factor as easy to identify. There were few risk factors that they found not very easy to identify.

Specific strengths and weaknesses of the aide memoire were determined from the comments made by inspectors. All comments were then discussed by the development team in relation to how they could improve the MAC. However, not all comments could be taken forward, for example, inspectors' difficulty in gauging the weight of an unmarked load. The many useful comments made by inspectors are listed in Table 16, along with the action taken as a result.

In general, the inspectors found the tool to be robust and suitable for assessing manual handling risk. Tasks where the MAC was not considered sufficient were identified. Again, this information was fed into the set of recommendations in Table 16.

5.4 LEVELS OF CONFIDENCE

A very positive result was found when inspectors rated their levels of confidence in assessing manual handling risk. The average confidence level was found to shift from fairly confident prior to receiving the MAC to very confident after receiving and using the MAC. Inspectors also rated their confidence in making manual handling enforcement decisions. Confidence rating shifted from a little/ fairly confident prior to receiving the MAC to fairly/ very confident after receiving and using the MAC.

Inspectors preferred the A5 pocket book size format of the chart as opposed to the original A4 prototype.

5.5 GENERAL FINDINGS

As expected, despite the high incidence rate of MSDs, only a few inspectors are currently making manual handling enforcements. It was found that the MAC provides a usable tool that increases inspectors' confidence in identifying manual handling risks and making manual handling enforcement decisions.

Overall, inspectors found the MAC useful when identifying manual handling risk and increasing duty holder awareness. Inspectors also reported the MAC to be sufficiently robust and suitable for most manual handling assessments.

5.6 RECOMMENDATIONS FOR SPECIFIC CHANGES TO THE MAC

The evaluation has determined the strengths and weaknesses of the tool, and most importantly where and how it can be improved. Specific comments made by inspectors about the different lifting tools and aide memoire were invaluable. Those the development team thought appropriate, and with practical implications, were used to develop a set of recommendations for changes to be made to the MAC to improve its overall usability.

Table 16 lists the comments made by the usability panel and practical recommendations of what improvements could be made. It further states the action taken and/or the decision process of applying those recommendations. Not all comments are listed, particularly those of a positive nature, neither does it report comments verbatim. Instead, attention is focused on what action was taken in response to the user feedback.

Table 16 Comments and recommendations made by the user panel and subsequent actions

<i>Comments and recommendations</i>	<i>Action</i>
<ul style="list-style-type: none"> • The carrying tool: drop the man carrying a toolbox and change to another object. 	<ul style="list-style-type: none"> • Changed to man carrying reel of cable
<ul style="list-style-type: none"> • Add in the <i>Hand distance from low back</i> risk factor for carrying operations. 	<ul style="list-style-type: none"> • Made appropriate change
<ul style="list-style-type: none"> • Some confusion with <i>Vertical lift distance</i> risk factor. 	<ul style="list-style-type: none"> • The inspector concerned had confused <i>Vertical lift distance</i> and <i>Hand distance from low back</i>. Photographs with more detail resolved this.
<ul style="list-style-type: none"> • Review layout of score sheet so it is in accordance with the charts. 	<ul style="list-style-type: none"> • Modified score sheet risk factors to coincide with flow chart risk factors.
<ul style="list-style-type: none"> • Include an index/contents page at front of document. 	<ul style="list-style-type: none"> • Made appropriate change.
<ul style="list-style-type: none"> • Insert a total score box for all <i>Environmental factors</i> (as for <i>Obstacles en route</i> risk factor). 	<ul style="list-style-type: none"> • Made appropriate change.
<ul style="list-style-type: none"> • Some confusion with the aide memoire for <i>Hand distance from lower back</i>. 	<ul style="list-style-type: none"> • Adding appropriate arrows to diagram may reduce confusion of aide memoire – believed to be caused by technical terminology.
<ul style="list-style-type: none"> • Re-label the x-axis of the load/frequency graph. 	<ul style="list-style-type: none"> • Made appropriate change.
<ul style="list-style-type: none"> • Confusion with distinction between ‘steps’ and ‘ladders’. 	<ul style="list-style-type: none"> • Made distinction in text.
<ul style="list-style-type: none"> • Add to aide memoire; for <i>Grip on load</i> that the container should be fit for its purpose. 	<ul style="list-style-type: none"> • Made appropriate changes.
<ul style="list-style-type: none"> • Confusion with what is meant by ‘space constraints’ in relation to <i>Postural constraints</i>. 	<ul style="list-style-type: none"> • Added more detail to aide memoire in order to clarify the definition of postural constraints.
<ul style="list-style-type: none"> • Add an amber risk criteria to the aide memoire of <i>Vertical lift distance</i>. 	<ul style="list-style-type: none"> • Made appropriate changes.
<ul style="list-style-type: none"> • Confusion and inconsistencies with the and/or terminology of the charts. 	<ul style="list-style-type: none"> • Discussions with inspectors found that an inspector had misunderstood the sentence.
<ul style="list-style-type: none"> • Lift above head places more than musculoskeletal strain there is also cardiac strain. 	<ul style="list-style-type: none"> • The musculoskeletal risk factor remains the same. No change required.
<ul style="list-style-type: none"> • Floor surface to include trip hazards as a risk factor in the red or amber box. 	<ul style="list-style-type: none"> • This is included in the carrying flow chart where it is most applicable.
<ul style="list-style-type: none"> • Reduce the amount of information on the score sheet to improve clarity 	<ul style="list-style-type: none"> • Not possible.
<ul style="list-style-type: none"> • The team handling risk factor should say “Communication, co-ordination and control” 	<ul style="list-style-type: none"> • Made appropriate change
<ul style="list-style-type: none"> • Are psychosocial factors considered? 	<ul style="list-style-type: none"> • Yes, but only on the score sheet due to lack of clear available data.
<ul style="list-style-type: none"> • Results of benchmarking study found green risk rating of 1 not adequate. 	<ul style="list-style-type: none"> • Rating of green risk factor changed to 0 as advised

6 PHASE 2: USER FEEDBACK ON CHANGES MADE

6.1 METHOD

The MAC tools were revised as a result of the user feedback from Phase 1 of this study. This revised version was distributed to the same usability panel who were asked to feedback any comments they may have regarding the revised MAC chart to the development team. They were asked to comment on their general impressions of the MAC, how easy or difficult they found it to use and to report and good points or problems they may have found. Some comments were received over the telephone.

6.2 RESULTS

Overall the comments received were very positive. The user panel referred to the MAC as 'excellent', 'good job' and 'just what we needed'. Specific comments are listed in Table 16.

Table 17 Comments received from the user panel in response to receiving the revised version of the MAC

Comments on the revised version of the MAC

- Looks impressive.
 - Excellent booklet.
 - Very clear.
 - Good illustrations make it easy to use.
 - The arrows on the photographs are a big improvement.
 - The photographs are more effective than the mannequins.
 - It is a very useful tool.
 - Changing the order of the flow charts to have carrying before the team lifting operation makes sense.
 - Having a contents page helps to navigate the booklet, but there are no page numbers.*
 - There aren't any page numbers.*
 - The score sheet layout is straight forward.
 - Good to have the explanation sentence suggesting resultant action to be taken .
 - Is good for reassessing tasks before and after control measures have been implemented.
 - The scoring is great to show policy holders where changes need to be made to reduce the overall score.
 - The explanatory paragraph at the beginning is a reminder of the Priority Program.
 - Useful asterix on the contents page explaining which flowcharts to use, although page numbers need to be added.*
 - The pictures are very clear.
-

**This oversight was easily rectified before the MAC went to print*

6.3 CONCLUSION

Phase 2 of the usability study assessed the acceptance of the changes made to the MAC tool ensuring these were an improvement in the tools development. The positive feedback obtained from the usability panel indicated that the revisions made were an improvement to the usability of the MAC. In addition, no comments suggested further improvements which could be made and the development team were left confident in the future success of the charts.

7 DISCUSSION

The Manual Handling Assessment Charts (MAC) has been shown to be a user-friendly screening tool that has been developed to help inspectors identify manual handling risk factors. It enables inspectors to make an initial appraisal of the work activities and helps determine the extent to which employers are managing musculoskeletal risks.

At the onset of the project the development team were aware of differences between the types of tasks assessed by HSE inspectors and LA inspectors. HSE inspectors tend to focus on larger industries where there are predicted types of risks that need to be controlled. By contrast, LA inspectors tend to assess small to medium sized enterprises (SMEs) where workforces typically carry out a wide variety of tasks. It was therefore important to have representatives from both HSE and LA inspectors on the usability panel. This was successful, and the results gave rise to no concerns that these differences would affect the success of the MAC in either situation.

The development team were mindful of the need to have potential users involved throughout the MAC development process. This included inspectors being involved in the original design of the tool as well as the usability study. It was imperative the tool was assessed by potential users and that the inspectors were given a sense of ownership of the project. Feedback from users also uncovered false assumptions made by the development team.

Using a questionnaire as a means of assessment proved highly successful. It enabled inspectors to read through what they would be asked prior to using the tool. They were able to consider the questions while using the tool and reflect on their experiences.

Ideally, a series of expert-user walkthroughs would have been carried out, where an ergonomist in the development team would go out on inspection duties with inspectors. This would have allowed direct assessment of how the MAC was being used and on which types of tasks, permitting direct resolution of any problems inspectors were having with the tool. Resource limitations meant this thorough analysis was not feasible, but the questionnaire provided the information required.

The usability study has met its aims of identifying the strengths and weaknesses of the draft MAC. A set of recommendations were successfully extrapolated from users' comments and incorporated by the development team into the tool. The potential users accepted the changes made to the MAC. In addition, the future success of the MAC was gauged as inspectors were asked how their confidence in making manual handling assessments has changed after receiving and using the MAC, and how it will assist them in meeting the targets of HSE's Musculoskeletal Disorders Priority Programme.

It is concluded that the developed tool is highly usable and accepted by both HSE and LA inspectors. The MAC is sufficient and robust enough for inspectors to assess manual handling risks in most situations. All components of the tool were found to be easy to use, and useful in identifying manual handling risk and for increasing duty holders' awareness. More importantly after receiving the MAC inspectors have become more confident in assessing manual handling risk and making manual handling enforcement decisions.

The next stage of the development is to assess how appropriate the MAC is for use by duty holders, and if appropriate how to make the MAC available on the HSE website.

8 REFERENCES

- 1 Health and Safety Commission (2000a), *Securing Health Together: A long term strategy for England, Scotland and Wales*, (Sudbury, Suffolk: HSE Books), MISC 225
- 2 Health and Safety Commission (2000b) *Revitalising Health and Safety: Strategy Statement June 2000*. The Stationery Office 2000. Further copies are available from Department of the Environment, Transport and the Regions, Free Literature Service, PO Box 236, Wetherby, West Yorkshire LS23 7NB. Tel: 0870 1226 236 Fax: 0870 1226 237 Website: <http://www.detr.gov.uk/pubs/index.htm>
- 3 Health and Safety Executive (1998), *Manual Handling. Manual Handling Operations Regulations 1992. Guidance on Regulations* (Second Edition) (Sudbury, Suffolk: HSE Books), L23.
- 4 Health and Safety Executive (1999) *A Guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995* (Second Edition) (Sudbury, Suffolk: HSE Books) L73.
- 5 Health and Safety Executive (2002), *Manual Handling Assessment Charts*. (Bootle, Health and Safety Executive), MISC 480.
- 6 Jones, J.R. and Hodgson, J.T. (1998), *Self Reported Work Related Illness in 1995: Results from a Household Survey*, (Sudbury, Suffolk: HSE Books)
- 7 Monnington, S.C., Pinder, A.D.J. and Quarrie, C. (2002), *Development of an inspection tool for manual handling risk assessment*, (Sheffield, Health and Safety Laboratory), HSL Internal Report ERG/02/20; HSL Report HSL/2002/30
- 8 Pinder, A.D.J. (2002), *Benchmarking of the Manual handling Assessment Charts (MAC)*. (Sheffield: Health and Safety Laboratory), HSL Internal Report ERG/02/21; HSL Report HSL/2002/31
- 9 Snook, S.H. and Ciriello, V.M. (1991), The design of manual handling tasks: revised tables of maximum acceptable weights and forces. *Ergonomics*, **34**, (9) 1197-1213.
- 10 Shackel, B. (1991), Usability – context, framework, definition, design and evaluation. In Shackel, B. and Richardson, S.J. (eds.) *Human Factors for Informatics Usability*. (Cambridge: Cambridge University Press), 21-38.
- 11 Tapley, S.E. (2002), *Reliability of Manual handling Assessment Charts (MAC) developed for health and safety inspectors in the UK. A field study*. (Bootle: Health and Safety Executive) Internal report.

9 APPENDIX - THE PHASE 1 QUESTIONNAIRE

SECTION 1 - GENERAL AND BASELINE INFORMATION

Name:
Unit/Location:
Date:

How long have you worked for HSE?

1.2 If you have attended the FOD Ergonomics or Musculoskeletal disorders enforcement course how many years ago did you do so?

	0-1	2-3	4-5	6-7	8-9	10>
--	-----	-----	-----	-----	-----	-----

1.3 Have you received any other training in ergonomics or related topics (e.g., musculoskeletal disorders, manual handling, DSE assessment)

YES / NO (circle as appropriate)

If yes then please give brief details.
--

1.4 How many enforcement notices have you issued in the last calendar year concerning manual handling? (Please include notices re management issues, assessment and controls)

	0	1-5	6-10	10>
--	---	-----	------	-----

(If 0 times then please go to Question 6)

1.5 How many times did you require specialist support to issue those notices and what form did that help take?

Visit needed	0	1-5	6-10	10>
Phone call only	0	1-5	6-10	10>

1.6 Have you taken / prepared any prosecution cases in the last calendar year concerning manual handling? (Please include notices re management issues, assessment and controls)

YES / NO (circle as appropriate)

If yes please give brief details

1.7 How many times in the last calendar year have you dealt with manual handling by giving advice (Verbal / Letter) rather than formal enforcement ?

	0	1-5	6-10	10>
--	---	-----	------	-----

1.8 How many times did you require specialist support before giving that advice and what form did that help take?

Visit needed	0	1-5	6-10	10>
Phone call only	0	1-5	6-10	10>

SECTION 2 - THE FLOW CHARTS

2.1 Have you used any of the manual handling flow chart tools to assess manual handling activities in the workplace?

YES / NO (circle as appropriate)

2.2 If you circled NO to the above, why have you not used the MAC?

--

2.3 If you circled YES for question one, approximately, how many times have you used each tool?

Lifting Tool:
Team Handling Tool:
Carrying Tool:

2.4 As a method to identify key manual handling risks and increase duty holder awareness, how easy did you find each chart to use? (tick box as appropriate)

	Very Easy	Easy	Neither Easy or Difficult	Difficult	Very Difficult
Lifting Tool					
Team Handling Tool					
Carrying Tool					

2.5 As a method to identify key manual handling risks and increase duty holder awareness, how useful did you find each chart to use? (tick box as appropriate)

	Very Useful	Useful	Neither	Limited Use	No Use
Lifting Tool					
Team Handling Tool					
Carrying Tool					

2.6 How useful do you think the tool will be in helping you to meet the requirements of the priority programme in relation to manual handling? (Circle as appropriate)

Very Useful	Useful	Neither	Limited Use	No Use
-------------	--------	---------	-------------	--------

SECTION 3

The following questions relate to the usefulness of the aide memoire which accompanies the MAC.

The aims of the aide memoire are as follows:

- to provide a brief description of the risk factors in the MAC
- to assist with scoring the manual handling task
- to promote familiarity with risks i.e. can recall from memory

3.1 How effective is the aide memoire in fulfilling the above criteria? (circle as appropriate)

Very Effective	Effective	Neither	Not Effective	Not at all effective
----------------	-----------	---------	---------------	----------------------

3.2 When assessing each risk factor, please rate how easy it was to identify the risk?

3.2.1 The Load weight (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

3.2.2 The Hand distance from low back (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

3.2.3 The Vertical lift distance (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

3.2.4 The Trunk Twisting/sideways bending (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

--

3.2.5 The Postural Constraints (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

--

3.2.6 The Grip on Load (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

--

3.2.7 Asymmetrical trunk / load (circle as appropriate)

Very easy to identify	Easy to identify	Fairly easy to identify	Not very easy to identify	Very difficult to identify
-----------------------	------------------	-------------------------	---------------------------	----------------------------

Please specify any strengths and/or weaknesses:

--

3.3 Did you have any problems in deciding what level of risk (i.e. score) to give any risk factor?
YES / NO

3.3.1 If you answered YES to the above, what was the risk factor and what was the problem experienced?

--

3.4 Please rate how easy it was to score the following risk factors.

3.4.1 The Floor Surface (circle as appropriate)

Very easy to score	Easy to score	Fairly easy to score	Not very easy to score	Very difficult to score
--------------------	---------------	----------------------	------------------------	-------------------------

Please specify any strengths and/or weaknesses:

--

3.4.2 Other Environmental Factors (circle as appropriate)

Very easy to score	Easy to score	Fairly easy to score	Not very easy to score	Very difficult to score
--------------------	---------------	----------------------	------------------------	-------------------------

Please specify any strengths and/or weaknesses:

--

3.4.3 The Carrying Distance (circle as appropriate)

Very easy to score	Easy to score	Fairly easy to score	Not very easy to score	Very difficult to score
--------------------	---------------	----------------------	------------------------	-------------------------

Please specify any strengths and/or weaknesses:

--

3.4.4 Obstacles en route (circle as appropriate)

Very easy to score	Easy to score	Fairly easy to score	Not very easy to score	Very difficult to score
--------------------	---------------	----------------------	------------------------	-------------------------

Please specify any strengths and/or weaknesses

--

3.4.5 Communication and coordination (circle as appropriate)

Very easy to score	Easy to score	Fairly easy to score	Not very easy to score	Very difficult to score
--------------------	---------------	----------------------	------------------------	-------------------------

Please specify any strengths and/or weaknesses:

--

3.5 Were there any manual handling situations where you felt that the tool was not sufficiently robust or suitable to fully assess the risks? If so, describe the situation.

--

SECTION 4

The following questions relate to your confidence in identifying or assessing manual handling activities in the workplace.

4.1 When would you mainly use the MAC to identify manual handling problem(s)? (circle as appropriate)
Proactive Inspection / RIDDOR reports / Both

4.2 Before receiving the MAC, how confident did you feel about assessing and identifying manual handling risks?

Completely	Very	Fairly	A little	Not at all
------------	------	--------	----------	------------

4.3 Having received and used the MAC, how confident do you feel about identifying and assessing manual handling risks?

Completely	Very	Fairly	A little	Not at all
------------	------	--------	----------	------------

4.4 Before receiving the MAC, how confident did you feel about making manual handling enforcement decisions?

Completely	Very	Fairly	A little	Not at all
------------	------	--------	----------	------------

4.5 Having received and used the tool, how confident do you now feel about making manual handling enforcement decisions?

Completely	Very	Fairly	A little	Not at all
------------	------	--------	----------	------------

4.6 Do you have any further comments regarding the MAC? Please include comments on the overall layout and format of the assessment tools and any modifications you think could be made.

4.7 Which is your preferred format for the tools? (consider when using the MAC on inspection visits) (circle as appropriate)
A5 pocket size / A4 sheet