



Final report

**Meeting of Experts on the Code of Practice
on Safety in the Use of Machinery**
(29 November–7 December 2011)

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Introduction

1. At its 306th Session (November 2009), the Governing Body decided to convene a Meeting of Experts on a code of practice on safety in the use of machinery, and approved the Meeting's agenda and a composition of eight Governments, eight Employer and eight Worker experts. The Meeting was held in Geneva from 29 November to 7 December 2011.

Participants

2. Twenty-four experts were invited to the Meeting, eight of them appointed after consultation with the Governments of Brazil, Canada, France, Germany, Ghana, Japan, Malaysia and South Africa, eight after consultation with the Employers' group and eight after consultation with the Workers' group of the Governing Body.
3. Observers also attended the Meeting, representing the World Health Organization, the International Organisation of Employers (IOE) and the International Trade Union Confederation (ITUC).
4. The list of participants is attached as an appendix to this report.

Opening address

5. The Meeting was opened by Mr Assane Diop, Executive Director of the ILO Social Protection Sector, who welcomed all participants and observers to the Meeting. He expressed his gratitude to them, noting the importance of their expertise to the work of this Meeting. He mentioned that the ILO Guarding of Machinery Convention, 1963 (No. 119), and the Guarding of Machinery Recommendation, 1963 (No. 118), had a significant impact on the safety in the use of machinery. However, the review of the international labour standards from 1995 to 2002 revealed a need for reflecting new concepts in occupational safety and health (OSH) and the latest technical and legal developments regarding machinery safety. He stressed that the new code would usefully complement existing standards in this area and become another practical instrument to protect workers and contribute to protecting the safety and health of workers, reducing the costs of accidents and promoting Decent Work globally.

Nomination of Chairperson and election of reporter

6. The Office had requested Ms Rosi Edwards, Regional Director of the Midlands region in the Health and Safety Executive of the United Kingdom to be the Chairperson for this Meeting. The Government experts proposed Mr Gabriel Mansour, expert nominated by the Government of Canada, to be Reporter for the Meeting and this was agreed.

Presentation of the working documents

7. Mr Seiji Machida, Director of the Programme on Safety and Health at Work and the Environment (SafeWork) explained how the current draft code had been prepared reflecting the latest technical and legal developments. The new concept was to ensure the safety of machinery throughout its life cycle. Three key aspects addressed by the code

were: ensuring machinery safety at the design and manufacturing stage; establishing mechanisms for the provision of safety-related information from manufacturers to users through the supply chain; and ensuring safety measures at the workplace. The draft code included the responsibilities of designers, manufacturers and suppliers, in addition to the responsibilities of competent authorities and employers' and workers' rights and responsibilities.

8. Mr Machida reminded the participants of the ILO's principles for the Meeting of Experts, that Experts appointed as members of a meeting of this kind should serve in their personal capacity as experts and not as representatives of any government, group or other interest.

General discussion

9. The Employer experts thanked the ILO for its efforts in producing the current draft. They believed that the code needed to be clear, simple and relevant for all employers, especially small and medium-sized enterprises in developing countries. It should also provide consistent risk-based solutions, have wide application across all industry sectors and not become quickly out of date. It was also important for the Code to respect existing ILO instruments such as the Occupational Safety and Health Convention, 1981 (No. 155), and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), and their associated instruments.
10. The Worker experts also welcomed the ILO's initiative. They also stressed the need for the code to be consistent with other ILO instruments and codes of practice and thought that the *ILO Guidelines on occupational safety and health management systems (ILO-OSH 2001)* and the code of practice on safety and health in agriculture would serve as useful models to follow. They also wished to see greater emphasis in the code placed on policies and worker participation, safety and health committees and also on the control of health risks from machinery. They also considered that diagrams and charts would be extremely helpful to clarify the advice given.
11. The Government experts also thanked the ILO for producing the current draft. They emphasized that the code should provide the minimum requirements for the design and manufacture of machinery so as to ensure the safety and health of those who were using and maintaining it. Provisions for adequate instruction, training and supervision of workers were also important. In spite of the current global economic situation, OSH standards should not be compromised and the code should be used as guidance for national competent authorities in regulating and enforcing relevant legal requirements.
12. The representative from the WHO thanked the ILO for the invitation. She explained that the WHO Global Plan of Action (GPA) for Workers' Health for the period of 2008 to 2017 was complementary to the ILO Global Strategy on OSH adopted in 2003. She stated that the GPA particularly requested the establishment of the basic levels of health protection at all workplaces and the WHO was planning to develop minimum standards for health protection at work in the near future. Machinery safety was considered as an obvious and straight forward intervention to this end. The code to be developed should be practical and useful to all parties.
13. The Government expert from Malaysia, on behalf of the other Government experts, echoed with concurrence to the Office statement that they were attending the Meeting as Experts and not as representatives of their respective Governments.

Examination of the draft code

14. At several points in the code, it was pointed out that the Office text referred only to safety or accidents without reference also to health, ill health or diseases. It was generally agreed that the text should be more inclusive and refer to safety and health, occupational accidents and diseases, as appropriate, unless text made the additions unnecessary. The title of the code would also need to be amended to reflect this consideration. It was agreed to change the title to “code of practice on safety and health in the use of machinery”.
15. The importance of consistency in the use of terminology was also a common theme, both within the code and with other relevant ILO standards.
16. Differences in meaning between the different language versions of the text were mentioned at various points in the discussion. The Office informed the Meeting that the original draft code was prepared in English and it was accepted that there was a need to improve the French and Spanish versions. The Office requested the Experts to propose proper wording for the French and Spanish versions if they found inconsistencies.

Introduction

17. The Office explained that the overall purpose of the introduction was to outline the purpose, structure and application of the code, and to refer to other important ILO instruments relevant to improving safety and health in the use of machinery. In doing so, the introduction would clarify what an ILO code of practice was, and the Meeting agreed that a separate definition elsewhere in the text was not needed.
18. The Worker experts submitted a new and longer introduction and proposed to include at the beginning of the final publication a dedication to all workers who had lost their lives while working with machinery. They referred to two earlier ILO codes of practice¹ which contained dedications to workers who had lost their lives in the workplace. In addition there would be an explanation of how the code would help prevent such accidents in future.
19. While expressing greatest sympathy with those who had been bereaved by workplace fatalities, the Employer experts and some Government experts believed that it was not appropriate to include such a dedication in the code. They explained that the ILO code might in future be used as a model for national law and practice, so including such a dedication was inappropriate and that there were other more suitable places and occasions to express such sentiments. Some Government experts offered to draft a few suitably worded sentences about the importance of the subject matter in the introduction. However, this was not acceptable to the Worker experts.
20. The Worker experts made a strong plea for the Meeting to agree to include the dedication in the final publication of the code as a mark of respect for those who had lost their lives or been injured from workplace machinery. One Worker expert read out a letter from parents whose son had been killed in an industrial accident, expressing their grief. The Employer experts, while disagreeing with the inclusion of a dedication on the front blank page of the published code, stated that they would not object if the Office put in the preface or foreword words to reflect the importance indicated in the dedication, as this was the work

¹ The ILO code of practice on safety and health in the iron and steel industry and the code of practice on safety and health in agriculture.

of the secretariat. Some Government experts supported the Worker experts' view but the Employer experts and other Government experts reiterated their opposition to the inclusion of a separate dedication on a blank page at the beginning of the published code. After much discussion, no consensus on the matter could be reached.

21. Other minor textual amendments were made to the proposed new introduction to ensure clarification and consistency, and it was agreed.

Part I. General requirements

1. General provisions

1.1. Objectives

1.2. Scope

22. It was generally agreed that "Scope" should precede "Objectives" as this made more sense. The heading "Scope" was also changed to "Scope and application" and amplified, in particular, to explain the intended focus of the code, clarifying usual exclusions.

23. It was agreed that the concept of the hierarchy of controls needed to be included at this point in the text. The Meeting discussed a definition for the term and, after extensive debate, it was decided to add a section of "Hierarchy of controls" after "Scope" and "Objectives" based on the wording in the ILO code of practice on safety and health in the iron and steel industry.

24. Other wording was also added so as to be more helpful, for example, replacing "minimize" in paragraph 1.1.1(c) with "identify, eliminate, prevent and control" risks, etc.

1.3. Definitions

25. Several additions and changes were proposed and agreed. In particular, the Employer experts considered that the requirement for "adequate qualifications" in the definition of "competent person" was too onerous and that possessing adequate knowledge, experience and skills were the important factors. After some discussion it was agreed to remove that requirement.

26. The Experts discussed the definition of "Machinery" at length because of the potentially very wide scope of the term. The Government experts proposed an explanatory note on exclusions which was generally accepted by the Meeting. However, the Meeting eventually agreed to insert the note on exclusions in a paragraph on application under "Scope and application".

27. The Meeting agreed to adopt the following new definitions:

- *Dangerous occurrence*: This was consistent with wording in the code of practice on safety and health in the iron and steel industry.

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- *Fault tolerance*: Government experts proposed adopting the definition in a relevant IEC² standard and this was agreed.
 - *Incidents*: This term was consistent with that used in ILO–OSH 2001.
 - *Life cycle*: The Meeting preferred this term to “lifespan cycle”. The Government experts suggested including a reference to “construction” before the words “transport, assembly and installation”, but this was not generally believed to be necessary.
 - *Maintenance and servicing*: The Worker experts proposed that the definition should include the phrase “where the worker may be exposed to the hazards associated with the work”, but this was not generally accepted.
 - *Risk and hazard*: These terms were consistent with those used in ILO–OSH 2001.

2. General obligations, responsibilities and duties

2.1. Roles and obligations of the competent authority

28. Several important changes to the text were agreed. The Government experts considered that the requirement for market surveillance might impose too great a burden on competent authorities and, after some discussion, this phrase was omitted. However, the Worker experts emphasized the need for competent authorities to be proactive in ensuring that machinery placed on the market satisfied relevant legal requirements. In the paragraph dealing with accident investigation, it was suggested that a system was needed for selecting accidents, etc. for investigation, which should be expanded to include occupational diseases. Suitable wording was proposed and agreed.

29. Some changes were proposed but not agreed. In particular, the Employer experts suggested limiting the prohibition or restriction of the use of machinery to what was permissible under international trade rules. However, the Government experts said that most regulations coincided with international trade rules anyway and the addition was unnecessary. The Worker experts were concerned about workers losing wages as a result of any stoppage of machinery for safety or health reasons. However, while the issue was not in dispute, it was considered that it had been dealt with elsewhere in the code.

2.2. General responsibilities of designers and manufacturers

30. There was much discussion over where to refer to the hierarchy of controls within the text, in addition to the section on general provisions in Part I. The Worker experts wished to see it specifically mentioned under the responsibilities of designers and manufacturers, suppliers and employers because of the importance of the concept for all such persons. The Governments agreed, adding that the concept had different applications for each of these groups. However, the Employer experts preferred retaining the concept at the front of the code and to avoid needless repetition, and this was agreed. It was agreed to place “hierarchy of control” after “objective” as a new section.

31. Other detailed changes to the text were agreed, broadening out such phrases as “guards and technical devices” to include other technical measures and referring to “safety and health” risks so as to ensure that health issues were properly addressed, as well as safety ones.

² International Electrotechnical Commission.

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32. The Worker experts proposed expanding the requirement for manufacturers to provide instructions for use so as to include installation, and this was agreed. They also suggested that, as an important activity, inspection should be added to the requirement for safe operation and use. However, other experts considered that inspection was already implicit in the text and the addition was unnecessary, and this was agreed.
 33. The Employer experts thought the requirement for manufacturers to monitor and study reports of malfunctions, etc. highly aspirational and sought clarification as to how manufacturers might comply with it. After discussion, it was agreed to add extra sentences about using collected information to improve safety of machinery and about product recall.
 34. Figure 2 entitled “Iterative risk assessment process” was agreed subject to some minor changes, namely: to refer to risk reduction in the heading as well as risk assessment; to refer to modified as well as new machines in the first “bubble”; and to refer to adequate control of risks rather than acceptable level of risks.
 35. The Worker experts sought clarification of the term “the state of the art”. The Office explained that the phrase meant taking account of recent technical progress, so that further improvements could be made to machinery design if new technical developments made that feasible. It was agreed that the term “state of the art” required explanation and this would be given in the form of a footnote.
 36. The issue of foresight and foreseeable risks arose in the context of warnings about how machinery should not be used. The Employer experts highlighted the importance of experience in determining how machinery might be misused and the Government experts also stressed that foresight needed to be based on experience.
 37. The matter of consistency of text was raised again concerning use of the terms “operators”, “workers” and “persons”. It was agreed that “worker(s)” would usually be preferred but that there would be places in the text where “operator(s)” or “persons” were more appropriate.

2.3. General responsibilities of suppliers

38. The issue of practicability arose in the context of suppliers ensuring that relevant new information that they supply was passed on to customers. Compliance would not always be practicable where there was a chain of suppliers and the initial supplier had no knowledge of the eventual user.
39. There was a request for clarification about the provision for second-hand machinery to meet the technical requirements of supplying countries and those of where machinery is being supplied. The Office explained that the intention was to prevent industrialized countries from “dumping” substandard used machinery onto developing countries where relevant supply legislation might not be up to date or be adequately enforced. Although the intention of the text was clear, the Employer experts pointed out that compliance would be impossible in cases where detailed national standards conflicted. The Meeting agreed that the code should refer to this code of practice instead of national legislation in the country of supply.

2.4. General responsibilities of employers

2.4.1. *Safety policy and organization*

40. The Worker experts underlined the need for the code to reflect the provisions of ILO–OSH 2001. In particular, they proposed that the code should refer to the need for employers to develop OSH policies, in consultation with workers and their representatives, to encourage

workers' contribution to policy formation, to hazard identification and to risk assessment. The Employer experts, agreeing with these principles, emphasized the need for workers' commitment and partnership. The Government experts noted that a worker's right to participate was addressed later in the code and argued for simplicity of text. The Worker experts' proposal was eventually accepted and the text modified accordingly.

2.4.2. Selecting and buying machinery

41. Safety and health were an important consideration when buying machinery and the Government experts wanted to ensure that employers doing so would ensure that such machinery satisfied relevant safety and health requirements. The cheapest products were often not the safest and employers should select machinery carefully, taking into account all factors affecting safety and health. Appropriate consultation with workers was also important when buying machinery and suitable changes to the text were agreed.

2.4.3. Inspection of machinery

42. The Employer experts asked for clarification of the term "hazardous machinery". The Government experts explained that national laws and regulations often required the regular inspection of certain types of machinery that were especially hazardous. It was agreed to add appropriate wording to this paragraph to reflect differences in national requirements.

2.4.4. Risk assessment and risk control

43. Discussion ranged over a wide range of topics related to risk assessment, from the need to consult with workers and their representatives, to the inclusion of ergonomic, biological and other health risks, and engineering controls. The Employer experts proposed that the heading should refer to "risk reduction" instead of "risk control" to ensure consistency with other parts of the text.
44. It was accepted that there would always be some degree of risk in work situations and emphasis should be given to the adequate control of risks. The text of the code needed to reflect this and phrases such as "risk reduction" were appropriate. The concept of reducing risks to "the lowest practical level" was also used in other international standards on safety and health and its meaning was broadly understood.
45. On the matter of personal protective equipment (PPE), it was important for it to be both fit for purpose and available for workers to use. Workers also needed to be consulted in the selection of PPE. There was a suggestion that the code should require workers to be medically evaluated for fitness to use PPE. However, the Worker experts believed that such a requirement would be a part of workers' health surveillance which went beyond the scope of this code. The Meeting accepted that it would be satisfactory just to require workers to be consulted when PPE was being selected and for them to be adequately trained in its proper use.
46. The Employer and Worker experts proposed to move the whole of Appendix I, entitled "Risk assessments and control", into this section of the text since it provided useful guidance for employers. The Government experts concurred and further proposed that the text should also be made relevant to manufacturers and designers. The Meeting affirmed that the proposal was consistent with the aim of the code which covered the whole life cycle of machinery. The Worker experts in particular referred to the need to provide guidance for users of older machinery.

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47. The Meeting agreed to use the text of Appendix I as a basis and to place it as a box at an appropriate point within the above section. The Government experts suggested referring to a relevant ISO³ standard, but the Worker experts stated their general objection to referring, in the main body of the text, to standards that had not been agreed on a tripartite basis. The Employer experts also pointed out that such standards might be updated within a few years. Since this code was intended to have a long shelf life it was decided to refer to any relevant standards like these in the bibliography.
 48. The Employer experts proposed that employers should be required to ensure that workplace machinery complied with the requirements of the code, or other relevant international standards, etc. taking into account the “state of the art”, as defined earlier in the text. This was similar to the requirement placed on manufacturers and it was agreed to modify that requirement so that it applied to machinery users.
 49. The Employer experts proposed new text to require employers to undertake ergonomic risk assessments of machinery and they submitted a simple table to assist with such assessments. The Worker experts also submitted a list of specific points that should be considered when undertaking such assessments. All such additions were agreed by the Meeting, subject to some minor text changes.

2.4.5. *Use of machinery*

50. The Employer experts noted that this section was the first to mention that the public were to be offered protection under this code. Other experts thought that this was not unreasonable as members of the public might sometimes be at risk from work-related incidents, giving as examples visitors to factories or members of the public endangered from the collapse of a tower crane.
51. After extensive discussion it was decided to omit from the code all references to other persons, leaving only “workers” within the scope. It would be left to national legislation to deal with the matter of protection of other persons who might be exposed to risks from work activity, such as members of the public, site visitors, etc.

2.4.6. *Recording and documentation*

52. Several changes were agreed, including a proposal from the Worker experts, that all records and documentation should be kept available for workers, their representatives, and for the competent authorities. The Employer experts proposed that when faults or defects from machinery were discovered, such as following dangerous occurrences, employers should pass on relevant information to the manufacturer or supplier. This was also accepted.
53. The Meeting also agreed to new text, put forward by the Employer experts, on documenting work methods for high-risk machinery that could also be used for training and skills development and for other purposes. The Employer experts offered suitable wording covering safe operating procedures, job safety analysis, safe work method statements and work instructions.
54. The Government expert from Brazil raised the question as to whether the code should specifically address the needs of disabled workers. However, the Meeting generally agreed that such matters should be adequately addressed under the risk assessment requirements and that there was no need for specific wording on this.

³ International Organization for Standardization.

2.4.7. Maintenance

55. The Meeting discussed to what extent manufacturers' instructions should be followed when undertaking maintenance. The Worker experts suggested that the wording in the Office text, "should be taken into account", weakened the need to follow such instructions. It was explained that manufacturers' instructions should normally be followed, but they sometimes became out of date, notably for old machinery, in which case it was necessary to follow newer instructions. The Office text was left unchanged.
56. Taking the hierarchy of controls into account, the Meeting agreed to include the addition of further wording addressing the identification and control of hazards. Similarly, it was agreed to reorder the list of precautions that should be taken to avoid unexpected injury to maintenance workers. Other minor changes were also agreed.

2.4.8. Decommissioning and disposal

57. The Worker experts suggested including transportation as part of the disposal of machinery. However, it was pointed out that under international standards it was the transporter who had obligations for safe transportation; it was agreed to include a reference to such standards in the bibliography to the code.

2.4.9. Competence, education and training of workers

58. The Meeting agreed that employers should also provide certifiable training for workers that might be required under national law and practice, and that the competent authority should be responsible for arranging such training.
59. It was also decided that a reference to information and instructions should be included in this section, as well as a new paragraph on the use of PPE. Other minor changes to the text were also agreed.

2.5. Workers' rights and obligations

60. The Employer experts objected to including "Workers' rights" in the title to the section, arguing in favour of wording such as participation and cooperation, bearing in mind that workers have responsibilities as well as rights. They also pointed out that the wording should be consistent with the wording in ILO-OSH 2001 which, at present, it was not. The Worker experts emphasized the importance of protecting workers' rights but agreed with a focus on participation and also replacing "obligations" with "responsibilities". The Meeting agreed to this and also to reorder this section so that "Responsibilities of workers" came before "Rights of workers".
61. The Worker experts emphasized the importance of workers being able to remove themselves from danger to ensure their own safety and health and their right to be consulted before decisions were taken on risk assessments. The former point was agreed, but on the latter, the Employer experts pointed out that national legislation did not always permit such consultation, especially where manufacturers were concerned. The Experts all agreed that workers had an important role to play in contributing to workplace risk assessments and the text would be modified so that it clearly referred only to workplaces.
62. The Worker experts also proposed that workers should have the right to ensure that employers and competent authorities investigate accidents. The Government experts considered that this expectation was unrealistic since competent authorities did not have the resources to investigate all reported accidents. The Employer experts concurred and the proposal was not accepted.

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- 63.** The Worker experts also proposed that workers should have the right: (1) to appeal to the competent authority if they considered that the measures taken and the means used by employers were inadequate for the purpose of ensuring their safety and health in accordance with national law and practice; and (2) to be provided with adequate medical treatment and compensation following accidents. The first point was agreed. However, the Government and Employer experts considered that the second point was outside the scope of the code and this too was accepted by the Meeting.
- 64.** The Worker experts proposed additional text to this section so as to include the workers' right to participate in the application and review of OSH measures and to select OSH representatives, and representatives in OSH committees, in accordance with national law and practice. Other changes were also agreed, including the addition of training for workers and a reference to emergency arrangements. This was agreed.
- 65.** The Employer experts said that the right to request and participate in accident investigation should be restricted to "relevant" workers, since it was not appropriate for any worker to make such a request. The Worker experts preferred the current wording of the text, saying that worker investigation was dealt with case by case. The Government experts agreed, adding that workers not directly involved in an accident might bring fresh information or insights. This proposal was not supported by the Meeting.

2.6. Cooperation

- 66.** The Meeting endorsed the importance of cooperation and agreed to a modified proposal from the Worker experts that employers should establish and encourage the participation of workers and their representatives in safety and health committees. The Experts also agreed that employers should establish and maintain appropriate arrangements and procedures for ensuring internal communication and ensuring that the concerns, ideas and inputs of workers and their representatives were received, considered and responded to.
- 67.** The Employer experts proposed that this section be included under the previous one, but the Meeting agreed that cooperation was distinct from worker participation and, therefore, the two sections should not be brought together.

Part II. Technical requirements and specific measures

3. *General statements*

- 68.** It was agreed that this section should have a statement on its purpose and application.
- 69.** Various options were considered for identifying different responsibilities within Part II of the code, including an explanatory note at the beginning or the use of symbols beside individual paragraphs to indicate where particular responsibilities lay. The Experts suggested placing identifying symbols at the beginning of each paragraph in this section so as to indicate whether the designer/manufacturer or the employer had responsibility for ensuring compliance. After extensive discussion, and with advice from the representative of the ILO Legal Adviser, it was decided not to proceed with this approach since much more text would need to be written and the code would be lengthened unnecessarily.

3.2. Lighting

- 70.** Clarification of certain wording in the text was agreed after some discussion. Thus machinery lighting would be required not to cause specific dangerous effects, replacing a requirement for it not to cause any nuisance from shadow. In the paragraph dealing with

lighting for machinery parts requiring frequent inspection, it was agreed to delete references to “frequent”.

3.4. Ergonomics

3.4.1. *Considerations at the design and manufacturing stages*

71. The Experts observed that much of the text in this section was based on other international standards, notably the EU Machinery Directive (2006/42/EC). The Meeting discussed some published guidance on the application of that Directive as it related to ergonomic factors, including a helpful diagram, and experts agreed to replace much of the Office text with text from that guidance. The Experts also agreed to cross reference the section dealing with general responsibilities of designers and manufacturers with this section.

72. The Employer experts submitted new wording providing background guidance on ergonomics, including such matters as physical body dimensions, strength, stamina, posture and biomechanical aspects of the human body in motion. The new text was agreed subject to some minor textual changes.

3.4.1.2. *Adjustable features*

73. Some of the specific issues listed in this section were more appropriately placed elsewhere in the code and the text would be suitably reordered.

3.4.2. *Measures to be applied at the workplace*

3.4.2.1. *Operators’ body sizes and shapes*

74. The Worker experts suggested that more guidance was needed on the interpretation of this section, to which it was suggested that references to relevant international standards could be added to the bibliography. After some discussion it was agreed to remove this section since the matter was adequately addressed elsewhere in the code.

3.4.2.2. *Working postures*

75. The Worker experts emphasized that it was important for work stations to be suitably adapted for workers. They proposed some textual changes regarding the work station and work organization, that both should be designed in such a way as to avoid awkward postures, and this was agreed.

3.4.2.3. *Visual considerations*

76. Several textual changes were made to reflect what was practicable and some text was removed as the subject matter was already covered adequately elsewhere in the code.

3.4.2.4. *Maximum force and speed*

77. The subject matter was now addressed adequately in the diagram inserted earlier on in this section, as mentioned above, and the paragraph was deleted.

3.4.2.5. *Work pace*

78. The subject matter was now addressed adequately in the diagram inserted earlier on in this section, as mentioned above, and the paragraph was deleted.

4. Control systems

79. The Government experts raised the question as to what extent this section needed to address detailed safety and health issues relating to control systems. After some discussion it was confirmed that a code such as this could not possibly include all relevant technical requirements and that it was best to leave such detail to relevant international standards (e.g. ISO standards), of which there were many.

4.2. Control devices

80. It was agreed that colours of controls should conform to international standards and that the code should reflect this at the appropriate point in the text. Indicators included auditory and tactile devices, as well as lights, and the text was expanded accordingly.

4.4. Stopping

81. The Employer experts mentioned the need for emergency stopping devices to be tamper proof so that they could not be overridden. In subsequent discussion, it was noted that the Maintenance section of the code might be a more appropriate point to cover this matter and since it did not already address maintenance of emergency stops, it was agreed to add suitable extra text at that point.

4.5. Failure of the power supply

82. The Meeting agreed to change “power supply” to “energy source” in this section including the title. It was agreed that machinery should be “fail-safe”, i.e. in the event of failure of a power supply the machinery should fail to safety rather than to danger. However, the term “energy source”, which clearly included all sources of energy, was considered preferable to “power supply” since the French version of the latter could be misconstrued as referring only to electricity.

5. Machinery guarding and protection against mechanical hazards

83. The Employer experts requested clarification about responsibilities for meeting the requirements of this section, whether these fell to manufacturers and designers, or to employers, or both. The Office explained that the intention had been that all persons had responsibilities under this section. Moreover, if machinery owners subsequently modified it, they took on the responsibility of a manufacturer. To clarify such matters it was agreed to insert additional wording at the beginning of Part II of the code.

84. In the context of the risk of break up during operation, the Employer experts pointed out that the owner’s maintenance schedule needed to be followed, since if this was not followed, the risk of break up would be increased.

85. Several changes to this section were agreed. In particular, the Employer experts said that the requirement for accessible parts of machinery not to have sharp edges, angles and rough surfaces should be specifically applied to use and maintenance operations. The Government experts affirmed the importance of not being able to easily defeat guards and provided additional wording.

86. The Office also clarified some of its intentions behind the current text. For example, the paragraph dealing with the need to guard against emissions was broadly worded so as to encompass different kinds of emissions and appropriate control measures, such as splash-guards. The design of fixed guards was intended to prevent all access, whether intentional

or unintentional, although the latter should also be addressed by risk assessments. The Government experts noted that some aspects of machinery guarding, such as positive activation modes of control devices, were not covered either in this section or in Appendix II. It was explained that the code was not intended to cover such aspects of machinery guarding and that users would need to refer to detailed technical standards for such matters.

6. Machinery guarding and protection against other hazards

6.3. Energy supply other than electricity

87. The Meeting noted that national electricity regulations and standards varied and agreed to include wording that took national law and practice into account. It was also recognized that such topics as monitoring and control systems and stored energy were generally addressed elsewhere in the text, and that including technical detail on such matters would add significantly to the complexity and length of the code.

6.8. Noise

88. Several changes were discussed and agreed. In particular, the Worker experts proposed adding new text to require employers to seek further information from the supplier on noise emissions and on appropriate precautions to be taken if such information was incomplete and, if necessary, to arrange for competent persons to do this. The Employer experts questioned whether the code could limit the duration of worker exposure to eight hours on the grounds that exposure could be longer than that. It was argued that limits on levels of exposures include such consideration in the nationally or internationally agreed exposure limits.

89. The Employer experts introduced the concept of a hearing conservation programme and the Worker experts requested addition of audiometric testing. Suitable new text was proposed and accepted, as was new text proposed by the Employer experts to the effect that workers should not be charged for individual hearing protectors.

6.9. Vibration

90. Several changes were discussed and agreed. In particular, the Worker experts proposed that the term “vibration” should be expanded to specify whole-body and hand-transmitted vibration, since both were relevant in the use of machinery. New wording was also proposed for vibration measurements being used to quantify exposure levels, similar to what was agreed for noise measurements, with comparisons made to nationally or internationally agreed exposure limits.

6.10. Radiation produced by machinery

91. The Meeting decided to change the title of this section to refer specifically to ionizing and non-ionizing radiation, noting that both hazards were covered by the following text.

92. The Employer experts considered that the phrase “undesirable radiation emissions” was unclear and the Meeting agreed to refer instead to radiations that were not essential to the functioning of the machine. New text was also agreed so as to be consistent with general principles reflected elsewhere in the code. For example, machinery needed to be designed and constructed in such a way as to prevent any accidental emission of radiation and exposure levels needed to be assessed and the health of the workers monitored in accordance with national law and practice.

6.13. Emissions of hazardous materials and substances

93. The Experts considered that some of the wording of the Office draft was cumbersome and suitable revisions were agreed, including some explanatory text in brackets. The Employer experts also proposed adding new text to address risks from the collection of hazardous material to ensure the protection of exposed workers. It was explained that the requirement for containment and evacuation devices included ventilation systems and that for them to have maximum effect it was important that they did not leak. These and other smaller changes to the text were agreed so as to ensure consistency with the principles reflected elsewhere in the code, such as the need to prioritize safety by design and to specify “workers” rather than “people” in the text.

6.15. Risk of slipping, tripping or falling

94. The Worker experts suggested that some mention should be made of fall arrest systems but it was initially considered that such matters fell outside the scope of the code. After further review, the Employer and Worker experts proposed adding further text to require fall protection PPE to be fit for purpose and anchor points to be provided in accordance with national law and practice. This was agreed.

6.18. Isolation of energy sources

95. The Worker experts addressed the need for specific procedures to be implemented for the control of hazardous energy. Discussion ranged over different means for ensuring energy sources were properly isolated and, in particular, the use of permit-to-work systems. The Government experts said that such systems could be easily abused and it was agreed to adopt new text referring to a formal management system instead of permits to work.

7. ***Information including file management (recording, documentation and declaration of conformity) and marking***

96. The Meeting considered that the title was unnecessarily long, as was the paragraph about warning of residual risks. Both texts were appropriately abbreviated so as to leave the meanings clear.

8. ***Supplementary measures relating to specific machinery types***

97. The Worker experts pointed to the usefulness of more specific requirements for chainsaws, pneumatic tools and cartridge tools in other ILO codes of practice. It was agreed to add references to relevant codes, namely those on safety and health in forestry and on safety and health in construction, at the appropriate points in the text and in the bibliography. It was also decided to amplify some of the text so as to clarify some of the terminology used and to make it more comprehensive, such as referring to climate control for driver cabins on vehicles and monitoring links with remote controls for lifting machinery.

98. The Meeting discussed to what extent to refer to the use of new and developing technology whose reliability had not yet been internationally accepted, such as the use of proximity devices on cranes. It was agreed to refer to such usage in so far as national law and practice allowed it.

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- 99.** The scope of the section on machinery for lifting persons was held to be unnecessarily restricted to machinery with suspended loads, such as hoists, and other modes of lifting persons should be included too. These included hydraulically powered equipment like mobile elevated work platforms and forklift trucks with properly designed work platforms. On a request for clarification by the Government experts, it was explained that the code was not intended to apply to cableways and they were thus not covered by this section.

Bibliography

- 100.** It was agreed that the bibliography should contain guidance on management systems, as well as technical guidance. Reference was also made to guidance on the EC Machinery Directive and relevant ISO standards which had been mentioned in earlier discussion on the text. The list of relevant ILO instruments, guidelines and reports was expanded and outdated sources of guidance were removed from the bibliography.

The appendices

- 101.** Several experts asked for clarification of the status of the appendices and, in particular, whether they were normative or informative. A representative of the ILO Legal Adviser stated that appendices in an ILO code of practice usually had the same status as the main body of text unless specific wording was inserted to modify this. The Meeting decided that the appendices in this code should be informative since it was likely that developing technology would overtake the current state of the art in methods of guarding. A new paragraph was inserted at the start of the appendices to this effect.

Appendix I

Risk assessments and control

- 102.** The Meeting agreed to place this appendix, with minor amendments, under general responsibilities of employers within section 2 of Part I of the code dealing with risk assessment and risk reduction.

Appendix II

Types of different guarding for machinery

- 103.** The Experts wished to include more explanations in the text on various aspects of guards and protective devices. Thus, in the general section dealing with safeguarding, new text was added to explain the primary function of guards and the role of guard opening scales in their design, installation and inspection.
- 104.** Throughout discussion on this section, there was a call for clear diagrams or sketches that would help to illustrate different types of machinery guarding and protective devices. It was agreed that these would be provided.

Safeguarding with guards

- 105.** Several amendments to the text were agreed so as to clarify it and provide further guidance. Regarding interlocking guards, reference was made to the position, selection and characteristics of guard response and stopping times and hold-to-run buttons were given as an example of additional control. The Government experts explained the importance of clearly distinguishing between manually operated adjustable guards and self-adjusting ones, both of which were types of adjustable guards. Adjustable guards offered varying

degrees of protection and there was some discussion as to whether they should really be termed “guards” at all.

Safeguarding with protective devices

- 106.** Further text was again inserted so as to provide further explanation and guidance, such as on the general use of protective devices and when it would not be appropriate to use them. Additional text was also inserted on the safe use of pressure-sensitive devices and of two-hand control devices.
- 107.** Experts discussed the use of vision systems, which was new technology, standards for which were still being developed. It was decided to mention such systems in the code as well as an additional explanatory note about them. Conversely, it was agreed that outdated technology, such as capacity presence-sensing devices and electromechanical sensing devices, should not be referred to in the code and the relevant parts of the text were deleted.
- 108.** The Experts asked for clarification of the term “enabling devices”. It was explained that such devices could be used on control pendants in the teaching of robots.

Complementary protective measures and emergency stops

- 109.** The Experts pointed out that complementary protective measures and emergency stops were different categories of device and should be treated as such in the text. Certain protective measures such as tripwires were sometimes used by workers instead of emergency stops, incorrectly so, in attempts to isolate machinery. The two subjects were thus treated under separate headings in the revised text.
- 110.** Additional wording was also provided on the intention of emergency stops, to clarify their use and to ensure that they function in a safe and reliable manner.

Appendix III

Detailed supplementary technical requirements for certain specific machinery types

- 111.** The Meeting agreed that the heading of this appendix should refer to “information” instead of “requirements” since the appendices were informative and not normative. Some of the text was modified so as to ensure that it was compatible with both what was practicable and in accordance with national law and practice. Other parts of the text were clarified to ensure that they were consistent with other parts of the code.
- 112.** At several points throughout the code, the experts proposed modifications to existing tables and diagrams in order to clarify the text and also including new tables, diagrams or illustrations. Such modifications and additions were generally supported and agreed after discussion.

Closing speeches

- 113.** The Worker experts said that the Meeting had been an intensive but worthwhile exercise, and thanked the Chairperson, the ILO, the secretariat, the interpreters and translators for facilitating their work. A fine spirit of cooperation had been preserved throughout.

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- 114.** The Government experts expressed pleasure at having had the opportunity to participate in the discussion of the code of practice and appreciated working with the Employer and Worker experts. They also thanked the secretariat and other staff, noting the benefits that the new code of practice would bring to individual countries in their updating of relevant law and practice.
- 115.** The Employer experts thanked their Worker and Government colleagues for their contributions. They considered that the code now achieved the right balance between being sufficiently technical and being user-friendly and were confident that it would stand the test of time. They also thanked the secretariat and their team for all their hard work.
- 116.** Mr Machida thanked all the experts for their hard work and achievement. There was still a long way to go before the goal of preventing machinery-related accidents and diseases could be achieved and it was hoped that the code of practice would assist in improving relevant national policies, systems and programmes. The ILO looked forward to working with all stakeholders to promote the safety and health in the use of machinery and OSH as a whole.
- 117.** He thanked the Chairperson for her skilful handling of difficult issues and for reconciling different views without lowering the standards set in the code. He also commended the technical experts who had been involved in preparing the ILO draft and members of the secretariat.
- 118.** The Chairperson endorsed the expressions of gratitude, also noting that the code had been completed in a very short period of time. All experts had displayed a spirit of cooperation, making fair and honest points where they disagreed but always seeking a constructive solution. The code should provide a sound basis for future action.

Adoption of the code of practice

- 119.** After examining the text of the draft code of practice on safety and health in the use of machinery, the experts adopted the code of practice as amended.

7 December 2011

(Signed) Ms Rosi Edwards
Chairperson

Mr Gabriel Mansour
Reporter

Appendix

List of participants and observers

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- Mr Seiji Machida, representative of the Director-General.
- Dr Tsuyoshi Kawakami, deputy representative of the Director-General.
- Dr Shengli Niu, expert.
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- Dr Marie-Louise Riley-Roberts, expert.
- Ms Tuuri Kerttula, expert.