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WORKERS AND CREATIVITY:

How to improve working conditions by participative methods?

26-27 June 2017 - Brussels

Workers' participation by Feedback method

CEN/TR 16710-1:2015

Ergonomics methods - Part 1: Feedback method - A method to understand how end users perform their work with machines

Fabio Strambi * - Massimo Bartalini **

** Eur-Erg, ETUI advisor on ergonomics an standardization*

***Azienda USL Sud Est – Toscana. - U.F. PISLL di Siena – Zona Alta Val d'Elsa*

ICS 13.110; 13.180

English Version

Ergonomics methods - Part 1: Feedback method - A
method to understand how end users perform their work
with machines

Feedbackmethode - Eine Methode zum Verständnis
wie Endnutzer ihre Arbeit mit Maschinen durchführen

This Technical Report was approved by CEN on 17 November 2015. It has been drawn up by the Technical Committee CEN/TC 122.

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1997



Marc Sapyr, director

..proposed a research project to collect users (workers and employers) suggestions to improve woodworking machines safety

....and integrating them into a strategy for improving machinery technical standards....



The strategy for improving machinery standards through us...

THE STRATEGY FOR IMPROVING MACHINERY STANDARDS THROUGH USERS' FEEDBACK

Based on their experience and practical knowledge of the equipment, users constitute a precious source of information on the adaptability of the technical solutions provide by the manufacturer. Exchanges of information between manufacturers and users may help to improve the design of equipment, in particular by revealing certain unusual uses of machines by their operators.

Partners in the “Feedback Method” studies

1997 - 2016

Public Authorities and Administrations, Market Surveillance Bodies, Labour Inspectorates	Social Partners Organizations, Technical Institutes
<p>HSE, Health and Safety Executive, United Kingdom</p> <p>GroLa BG, Großhandels- Berufsgenossenschaft, Germany</p> <p>KAN, Commission for Occupational Health and Safety and Standardization, Germany,</p> <p>Ministère de l'emploi, de la République Française</p> <p>Ministry of Social Affairs and Health of Finland</p> <p>A. USL, A. USL 1 Massa e Carrara; A. USL 4 Prato; A. USL10Firenze; A. USL 7 Siena, A. USL 8 Arezzo, A.USL 9 Grosseto, Italy;</p> <p>Regione Toscana, Italy</p> <p>ISPESL/INAIL, National Work Accident Insurance Institute, Italy</p>	<p>ETUI, European Trade Union Institute, Belgium;</p> <p>EFFAT, European Federation Food Agriculture and Tourism, Belgium;</p> <p>ACIMALL, Association of Wood Working Machinery Manufacturers. Italy;</p> <p>EPSU, European Federation of Public Service Unions, Belgium;</p> <p>FagligtFaellesForbund, United Federation of Danish Workers, Denmark;</p> <p>LO, Landsorganisationen i Sverige, Sweden</p> <p>SEKO, Union for Service and Communications Employees, Sweden</p> <p>SindNova, Roma, Italy</p> <p>Unite the Union, Britain and Ireland union, United Kingdom</p>

Feedback method



Woodworking machines



Forklift



Telehandler



Angle grinder



Combine harvester

Agricultural tractors



Countries	Companies	End users	Feedback method WGs	Machines
7	233	363	36	2044

Feedback method



Landsorganisationen i Sverige



**Azienda
Sanitaria
Firenze**



**Azienda
USL 3
Pistoia**



**Servizio
Sanitario
della
Toscana**



Facket för Service och Kommunikation



MINISTRY OF
SOCIAL AFFAIRS AND



FAGLIGT FÆLLES FORBUND



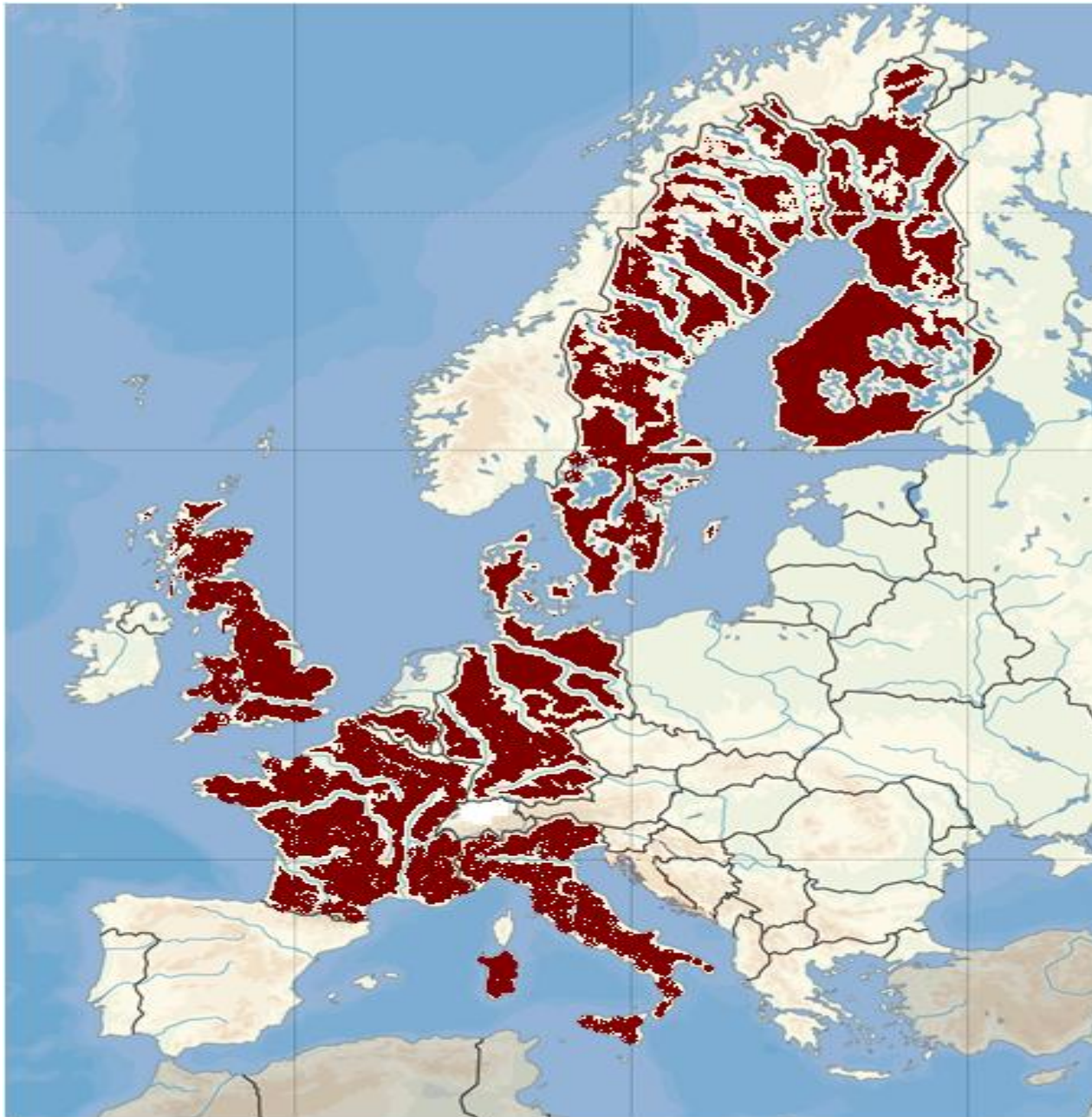
EGOD
of Public Service Unions



European Network
for Workplace Health
Promotion (ENWHP)
www.enwhp.org



Feedback method



Stefano Boy, TUTB Researcher

TECHNICAL STANDARDS

Safety of woodworking machinery : benefitting from workers' experience

KAN Kommission
Arbeitsschutz und
Normung

KANBrief 2/02

Ergonomia e norme tecniche di sicurezza: il contributo degli utilizzatori

La sicurezza delle macchine
per la lavorazione del legno

a cura di Fabio Strambi, Claudio Stanzani,
Massimo Bartalini e Manuela Cucini

Sociologia del lavoro
Teorie e ricerche

FrancoAngeli



Machine safety and ergonomics from the user's perspective

The hands-on perspective of employees is often given insufficient consideration in the discussion of occupational health and safety. Although the Machinery Directive made inclusion of both sides of industry in standardization activity mandatory from the outset, many opportunities continue to be unexploited. An innovative project in Italy indicates alternative paths which may be followed¹.

It would certainly be beneficial were the co-operation between employers' and employees' representatives and OH&S authorities, illustrated by the pilot study described here, to be continued in the form of a European "dialogue on safety". Among the authors' suggestions is that an "observatory network" be set up in which the experience of machine users can be gathered and exploited for improvement of engineered and organizational occupational health and safety.

Corrado Mattiuzzo

KAN: a German trade union voice in standards

Ulrich Bamberg

Commission for Occupational Health and Safety and
Standardization (KAN)



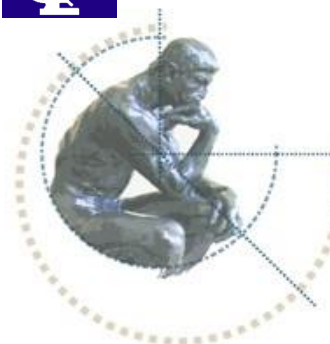
The “feedback method”

KAN has been collaborating for many years with the European Trade Union Institute (**ETUI**), the European Trade Union Confederation’s (**ETUC**) research arm, in particular **on implementing the "feedback method" to feed workplace users’ experiences back to standards developers so that better health and safety can be designed into standards.** So, it is not experts but **users of selected dangerous machinery** that are directly questioned **and can propose improvements.** It is a painstaking but supremely necessary job given that many standardization committees cannot possibly know what risks the products may pose in actual workplace use.

F. Strambi et coll.: "Travail du bois en Italie: des normes de sécurité forgées sur l'établi"



1 – 3 mars 2006, Nice, France



Design process
and human factors integration:
Optimising company performance



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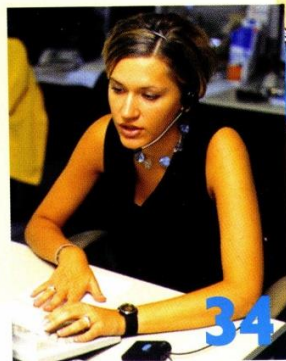
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Jose A. Benito



Feedback.
*A method to collect the contribution of
the users of machinery in order to
improve the quality of design standards*

F. Strambi
M. Bartalini

R. Cianotti
M.N. Tini

C. Stanzani





iea 2012

Recife, Brazil

18th World Congress on Ergonomics | February 12-16 2012 | Recife, Brazil

End users “Feedback” to improve ergonomic design of machinery

F.Strambi^{a, d, 1}, M. Bartalini^a, S. Boy^b, R. Gauthy^{b, d}, R. Landozzi^a, D. Novelli^c and C. Stanzani^c

^a*Regione Toscana, A.USL 7 di Siena, UF. PISLL A.Val d'Elsa, Italy*

^b*ETUI, Brussels, Belgium*

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^e*Regione Toscana, Gruppo Macchine, ASF Firenze, Italy*

Abstract. This paper describes the *Feedback* method designed to collect the contribution of users for the reconstruction and comprehension of the actual work and real activity for the improvement of the technical standards, design, manufacturing and use of machinery. The Feedback method has since now been applied successfully - in collaboration with public authorities, market surveillance bodies, social partners organization and technical institutes - to five different types of machines: woodworking machinery, forklift trucks, angle grinder and combine harvester. After ten years of experimentation in seven European countries Feedback has proved to be trans-nationally comparable and has attracted the interest of as much as 250 expert users - mostly workers, but also employers and technicians - who have shared their knowledge and experience by taking part in almost 30 working groups. The information collected with the Feedback method can be used by:

- CEN and ISO standardization committees and working groups to become aware of the problems relating to the real use of specific machines in different work contexts, and thus to be able to draw up new or to revise existing standards accordingly;
- Designers and manufacturers to produce better, more comfortable and safer machines and to provide precise instructions for use;
- Employers, users and workers for training purposes and for defining appropriate work procedures;
- Inspection bodies to enhance their knowledge and improve the efficiency of their interventions and advice.

Keywords: feedback method, machinery, ergonomics, end user, real work activity.

BRUSSELS, 27 MARCH 2006

Brussels, 27 march 2006

A European system to improve machinery safety by drawing on users' experience

Summary of the seminar organised by the Health and Safety Department of the European Trade Union Institute for Research, Education, Health and Safety (ETUI-REHS)

Stefano Boy, ETUI-REHS Officer, Machinery Safety and Standardisation



European Commission D.G. Enterprise and Industry (**Ian Fraser**):

"We believe that if the methodology is applied to other classes of machinery, similar good results will be achieved."

CONTENTS:

1. Introduction
2. Objectives of the seminar
3. Feedback, the method agreed with the project partners
4. The national data collection exercise
5. Round table
6. Overall conclusions and future plans



..... activation of new experiences





EUROPEAN COMMISSION
ENTERPRISE AND INDUSTRY DIRECTORATE-GENERAL

Aerospace, security, defence and equipment
Mechanical and electrical equipment

Brussels, 19th December 2006

M/396 EN

Mandate to CEN and Cenelec for standardisation in the field of machinery

3.5. When executing the standardisation tasks covered by this mandate, CEN and Cenelec are requested to take due account of **feedback from the end-users** of the machinery concerned.



**Draft report
of the 16th plenary meeting of
CEN/TC 122 Ergonomics
on 2008-09-25/26 in Solna, Sweden**

RESOLUTION 318

Subject **Technical Report based on the "Feedback"-method**

CEN/TC 122 asks ETUI to submit a proposal for a Technical Report based on the "Feedback"-method designed by Fabio Strambi. This proposal should be developed in **close co-operation with CEN/TC 114.**

Introduction

The importance of involving users in the design of machinery is recognized in most standards that deal with ergonomic design principles. In fact, i.e. EN 614-1 strongly recommends user involvement because it helps to identify measures and improvements for future design.

CEN Guide 414, EN ISO 6385:2004, EN ISO 9241-210:2010 and EN ISO 12100:2010 also provide for feedback from the end-users of machinery, and affirm the need to continue monitoring the effect of the system in order to safeguard against long-term deterioration in the performance or health of the users.

Collecting users' experiences by reconstructing their activities, how they perform their work in different real-life operating conditions, will yield knowledge of the problems that emerge from common, everyday use and help to identify possible corrections and improvements to harmonized technical standards and machinery design and manufacture.

EN 614

Safety of machinery. Ergonomic design principles

EN 614-1:2006+A1 2009

Terminology and general principles

EN 614-2+A1:2008

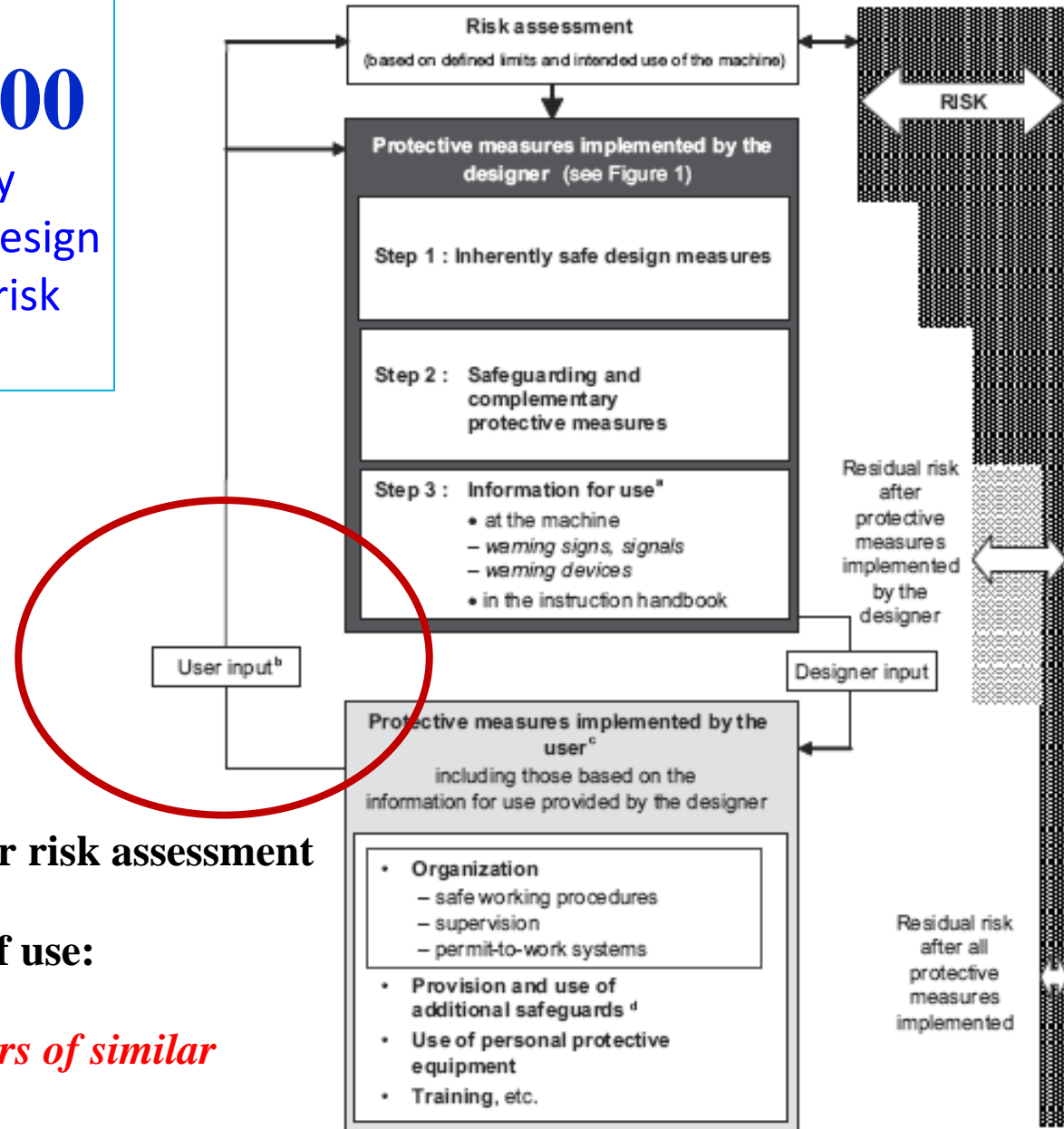
Interactions between the design of machinery and work tasks

...recommend to gather a feedback from the users of the machinery and to monitor the effect of the system on their health and safety status and to identify the improvements for the updating of the standard

... affirm the relevance to evaluate the work performed under operative conditions for a better evaluation of the quality of the design.

EN ISO 12100

Safety of machinery
General principles for design
Risk assessment and risk
reduction



section 5.2 Information for risk assessment

c) Related to experience of use:

...

- 3) *the experience of users of similar machines*

EN 614-2 +A1

Safety of machinery - Ergonomic design principles - Part 2: Interactions between the design of machinery and work tasks

4.3 Evaluation of work task design

The purpose of the evaluation of work tasks to be carried out in interaction with machinery and equipment is to find out to what extent the design fulfils the goals and requirements set out in this European Standard.

The feedback from the operators can be obtained in various ways. The following methods are suitable for this purpose and shall be used where appropriate:

- group discussions,
- interviews,
- questionnaires,
- checklists,
- observational studies,
- analysing critical incidents, and
- psychometric assessments on standardised scales.

European foreword

This document (FprCEN/TR 16710-1:2015) has been prepared by Technical Committee CEN/TC 122 “Ergonomics”, the secretariat of which is held by DIN.

This document is currently submitted to the Technical Committee Approval.

Standardization can release its full potential for growth, productivity and health and safety of citizens only when all interested parties are adequately involved.

This document has been prepared considering CEN/CLC Guide 17 “Guidance for writing standards taking into account micro, small and medium-sized enterprises (SMEs) needs”.

EN 16710 consists of the following parts under the general title *Ergonomics methods*:

- *Part 1: Feedback method - A method to understand how end users perform their work with machines* (Technical Report)
- *Part 2: A methodology for work analysis to support design*

These present independent methods that can be used to support the implementation of ergonomics principles, for example as advocated in EN ISO 12100 and the EN 614 series.

1 Scope

This Technical Report describes the "Feedback Method", a method designed specifically to collect the contribution of machinery end-users by reconstructing and understanding how work is actually performed (i.e. the real work). This method can help to improve technical standards, as well as the design, manufacturing, and use of machinery.

By collecting the experiences of skilled users, this method can be used to reconstruct their actual work activities under different operating conditions and with any kind of machine. This helps to identify all the critical aspects having an impact on health and safety, or associated with ergonomic principles. Moreover, it makes it possible to identify some basic elements for defining the standards for machines and for their revision and improvement. It can also improve production efficiency and identify any need for additional study and research.

The method is designed to minimize the influence of the subjectivity of the facilitators and researchers in reconstructing and describing the reality of work, and to maximize the "objective" contribution of the skilled users of the machine.

The method combines a high level of reproducibility, sensitivity, and user-friendliness with low demands in term of resources, which makes it attractive to micro, small and medium-sized enterprises.

This Technical Report is addressed to standards writers, designers and manufacturers, employers-buyers, end users, craftsmen and workers, market surveillance and authorities.

HesaMag #07

**Standardization:
what roles for
the unions?**



The European Trade Union Institute's (ETUI)
health and safety at work magazine
spring-summer 2013

Standards development – a flashpoint of technical expertise and conflicting interests

Laurent Vogel
ETUI

.....

1. Union participation is wholly effective only if linked to methods for feeding back workers' own experience of their working conditions. It is a knowledge source for which there is no substitute. This is a precondition,

.....



NEWS LIST

4 March 2016

ETUI contribution to safer machinery acknowledged by the European Committee for Standardization (CEN)



The 'Feedback Method' aims to feed workplace users' experiences back to standards developers so that higher safety requirements can be incorporated into European standards. This method, originally designed by the Italian expert Fabio Strambi, has been enhanced over the last fifteen years through cooperative efforts involving the ETUI and the standardization community at large. In December 2015, the 'Feedback Method' was adopted by the European Committee for Standardization (CEN) in a Technical Report. This is the first time that

□ a methodology based on workers' experience has been made available on the 'standards market'.

“Feedback method”

Choice of the machine



Preliminary data collection



Companies' identification



Inspection of workplaces



Working Group



WG' validated report



Technical report

Table 1 — Feedback Method — Work Group sheet

Sequence of tasks/activities ^a	Operating Procedure	Competence	Critical aspects: hazards/risks; disorders/diseases/injuries	Solutions, suggestions for prevention; need of further research
1)	[Detailed description of each action, procedure and method of executing each task/activity, with information on the equipment used, safety devices and personal protective equipment (PPE)...]	[Information about the competence required for: (1) optimal execution of the task/activity and each action (use of equipment; choice, use, and handling of materials); (2) organization of work; (3) understanding and applying the instruction handbook]	[Identification of: (1) the critical aspects affecting the health and safety of workers or limiting the efficient performance and reliability of actions: (2) hazardous and ergonomically unfavourable postures, incorrect work practices, environmental conditions (microclimate, dust lighting, layout, etc.); (3) fatigue, complaints, occupational diseases, accidents or injuries; (4) awkward postures, incorrect work practices, environmental conditions (microclimate, dust lighting, layout, etc.); (5) fatigue, complaints, occupational diseases, accidents or injuries; (6) work related stress or problems linked to organizational aspects (rhythm, shifts, etc.).]	[Identification of solutions/suggestions on how to eliminate or minimize the identified problems, hazards and risks and apply the relevant ergonomic principles to: machines, equipment, safety devices, PPE, work procedures, work organization, environment, etc.; Guidance on: Training, Inspection, Instruction handbooks. Proposals for further research to find new solutions]
2)				

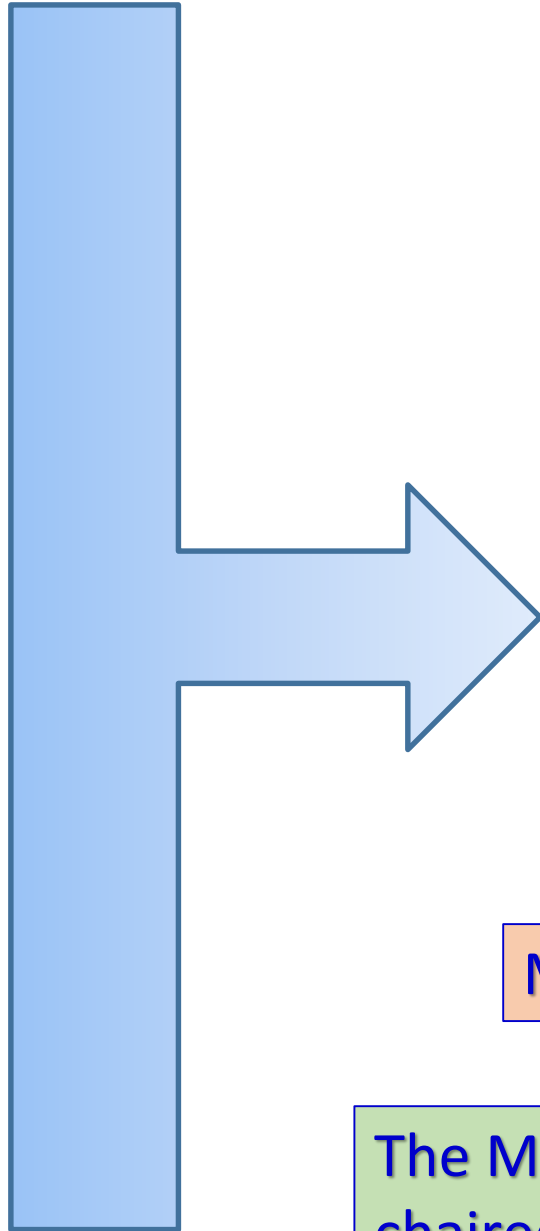
... for each work phase

^a Each column should be completed for each activity in the work phase.

.... standard amendments

Nr.	Comment (justification for change)	ISO 4254-1:2008	ISO 4254-7:2008	Current text	Proposed change/text	Importance for prevention	technical feasibility	generality	Cross-reference
	(Risk plus prevention suggestions) Prevention suggestions that identify improvements needed in the manufacture of the machine itself and guidance materials such as operators' manual.	chapter, section and paragraph	chapter, section and paragraph			(1, 2, 3 for high, medium, low)	(a, b, c for easy, medium, elaborate)	(requirement necessary only in specific countries or territories) (G global, L local)	Phase: number reference
1.1a	Risk of slips and falls from inadequate hand holds. In transport position chains and rails act as tripping mechanisms when exiting cab. Risk of strains from lifting and swinging ladders in and out or down. Also possible overbalance. Risk of pinching injuries. Operator-friendly guard rails around each ladder and high-risk areas e.g. engine bay	4.5.1.1	5.3.5	<p>5.3 Operator's work station</p> <p>5.3.5 Boarding means For boarding means, the provisions of ISO 4254-1:2008, 4.5.1.1 and 4.5.1.2, apply.</p> <p>ISO 4254-1:2008</p> <p>4.5 Operator stations</p> <p>4.5.1 Boarding means</p> <p>4.5.1.1 General 4.5.1.1.1 If the vertical height of the operator station floor or above ground level exceeds 550 mm, measured on level ground and with the specified tires with the maximum diameter at specified inflation pressure [see 8.1.3 t)], a boarding means shall be provided. The dimensions shall be as shown in Figure 3.</p> <p>4.5.1.1.2 Whenever the boarding means is located directly in line and forward of a wheel (i.e. within the track of the machine), provision shall be made for a railing to be located on the wheel side. This does not apply for the transport position. Shielding shall be provided on the back of steps or ladders whenever a protruding hand or foot</p>	<p>5.3.5 Boarding means (change) For boarding means, the provisions of ISO 4254-1:2008, 4.5.1.1 and 4.5.1.2, apply. The height of the first step is excessive and must be reduced. The height of the first step of boarding means to operator stations should not exceed 400 mm; for machines with slope compensation the height can be up to 550 mm at the maximum extension of levelling"</p>	1	a	G	2.1 2.6

... suggestions ...



**CEN and ISO and national
standardization committees
and working groups**

Designers and manufacturers

Employers and buyers

**End users, employers,
artisans and workers**

Market surveillance authorities

**The Machinery Working Group (MWG)
chaired by the European Commission**

- **Tanning of leather**



- **Manual handling
in the construction sector**



- **Scaffolding**



- **Grape harvesting machine**





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26-27 June 2017 - Brussels

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