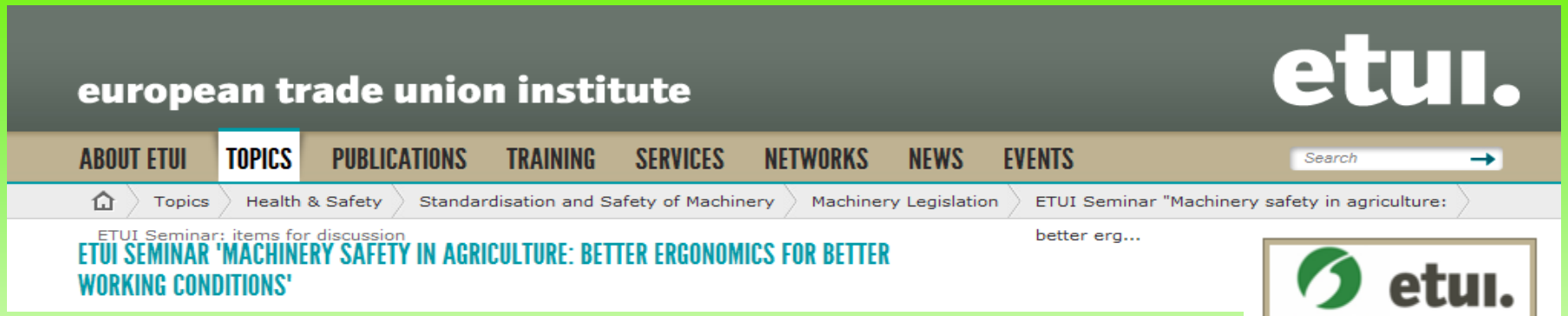

Combine Harvesters: the findings of the Feedback project

F. Strambi, M. Bartalini, D. Novelli, A. Fattorini, U. Shaffer, M. Belsey, S. Boy

Feedback method

Sozialversicherung für Landwirtschaft, Forsten und Gartenbau

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MINISTRY OF SOCIAL AFFAIRS AND HEALTH

Bruxelles 5 march 2013

Threshing


REGIONE TOSCANA GIUNTA REGIONALE
i manuali
MACCHINE AGRICOLE
rischi e prevenzione
la mietitrebbiatrice
2

Combine Harvester

etui.

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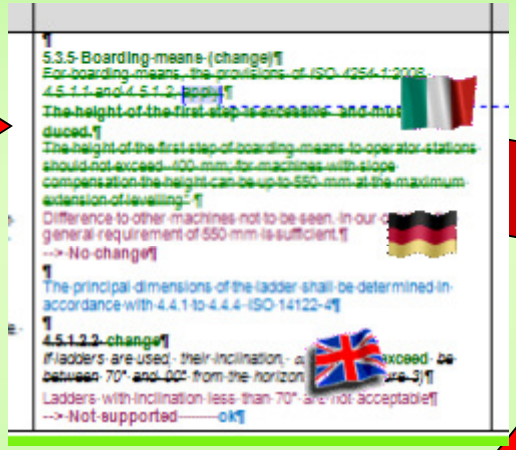
Feedback method

Feedback method

	Farms visited	N° of combine	Type	Skilled users
	20	85	Different type of machinery and different manufacturers	70
	10	14		10
	3	3		9
	13	15		21
	46	117		110

3	**Work phase:** HARVESTER			
Sequence of the operations	**Procedure**	**Professional qualifications and skills**	**Risks**	**Prevention suggestions**
	Description of the procedures for the **individual operations** with indication of the **equipment** used, the **safety devices, IPDs,** etc.	Indication of the professional qualifications needed to perform the **individual operations** optimally (use of the **equipment, materials, procedures,** etc., and information on the **user's manuals**)	Elements that constitute a risk for the **machine** itself, the **equipment, safety devices, environmental factors** (microclimate, illuminating powders, layout, etc.), **fatigue, organisational factors** (pace, shifts, etc.).	Preventive suggestions concerning the **risk elements** identified, including those regarding **training, user's manuals, safety devices, operating procedures, IPDs,** etc.
ASSESSMENT OF THE PLOT OF LAND	An assessment is first carried out of the situation of the plot of land where the harvest is to be carried out (assessment of the inclines, presence of ditches or canals, etc.) to choose the best approach to the work. Spaces for manoeuvre and for unloading the crop are created with the first runs of the harvester.	Specific training and experience.	Risk of wrong manoeuvre, collisions or capsizing due to lack of adequate space for the operations.	Improve the visibility of the rear part, also th installation of video cameras and monitor in the cab.
		Work on inclined grounds should proceed by moving transversely, following the altitude lines of the plot of land.	Risk of capsizing in soft, highly sloping terrain.	Provide a protective frame for the cab, and provide/use block systems for the driver's seat that facilitate the performance of the various driving operations. Appropriate training and awareness raising as to their use.
	When working ping surfaces, the stem may be acti e run (alarm sou	Knowledge of the indications of the operation and maintenance manual for withdrawing from the dangerous phase. Specific training.	Risk of partial loss of harvest and major risk of capsizing if the self-levelling system breaks down, if there is a flat tire, or if the ground softens.	Provide an incline indicator system of the machine with at least an indication of absolute safety, danger and alarm situations (some machines are already fitted with such a device). The operators are reporting a need for appropriate comprehensive protection for self-levelling machines which today seem to be derived from machines designed for the plain with necessary adaptations, but not designed from the outset for such purposes.

Feedback method



Template for comments and secretariat observations

Date:	Document: ISO 4254-7

1	2	(3)	4	5	(6)	(7)
MB[1]	**Clause No./ Subclause No./ Annex** (e.g. 3.1)	**Paragraph/ Figure/Table/ Note** (e.g. Table 1)	**Type of com-ment**	**Comment (justification for change) by the MB**	**Proposed change by the MB**	**Secretariat observations** on each comment submitted
2.20	5.2.1.1	New d)	te	During long work shifts the operator mostly uses the central control stick for modifying the speed, level of the cutting platform, etc. Repetitive and one-sided movements of the right arm and muscles are a risk for strain injuries.	Add: d) Ergonomically control joysticks shall be fully adjustable for reach	ok

Feedback method

27 proposed amendments to ISO 4254-7

… about

- Cabin, ROPS and restraint system
- Operator workstation
- Ladders and telescopic ladders
- Cleaning windows and doors
- Maintenance
  - Header system, chopper and stone trap
  - Grain tank and unloading auger
  - Grease points and filler necks for fluids
  - Batteries
- ……

Work phase: Towing on the road and field movements

Critical aspects / risks: Impact injuries on collision …

Suggestions *(D, I, S, UK)*

-**Automatic limiting of functions during highway travel (thresher, swivelling of discharge pipe, etc.);**
-**Double securing of the folding side panel;**
-**Use of CCTV systems;**
-**Fit mirrors such that they are vibration-free;**
-**Suitable location of the lighting equipment;**

- Fit equipment for marking and illumination of the combine harvester firmly to it.

-Installation of devices that ensure complete visibility of the encumbrance area of the rear wheels and the rear part of the machine (e.g. convex mirrors, mirrors adjustable from the cab, monitor and video camera, etc.);
-Possibility of installing sensors that indicate approaching dangers of power lines.

-A warning system for length and the combines width, as well as low hanging wires and tree branches, shall be the standard;

-Cameras on the rear of the machine for coupling purposes and general reversing manoeuvres;
-Electric mirrors;
-Size indication in cab i.e. length, width, weight height; also indications outside the cab for other road users; - Power line sensors ;

Work phase: Towing on the road and field movements

Critical aspects / risks: Impact injuries on collision …

Sug… (*D, I, S, UK*)

Some examples

ISO 4254-7

5.3.11.2 – Add:

Machines shall be equipped with at least two <u>remote controlled</u> rear-view mirrors, one on each side of the machine.

5.3.11.4 - Change wording to:

These mirrors shall be adjustable ~~while at the same time maintaining three-point contact if the adjustment cannot be made~~ remotely. The mirrors shall be capable of being adjusted to provide a clear image of the total height of the rear-most section of the machine from the operator's work station.

5.3.11.5 – Add:

If it is not possible to see the area just behind the machine from the operator's seat position <u>a video camera (CCTV) and an</u> audible reverse warning alarm, which shall be automatically engaged and in accordance with ISO 9533, shall be provided

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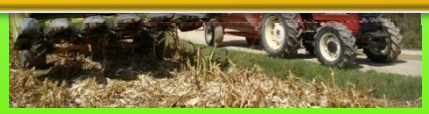
users; - Power line sensors ;



Work phase: Harvesting

Critical aspects / risks: Overturning, rollover, capsizing …

Suggestions *(I, S, UK)*

-Provide an incline indicator system of the machine with at least an indication of absolute safety, danger and alarm situations (some machines are already fitted with such a device);
-The machines must be equipped with systems that in case of capsizing (through an accident, wrong manoeuvre, loss of stability during use, etc.), provide a safe space in the driver's cab and maintain the operator seated in the driver's post;
-A tyre pressure indicator in the driver's cab is useful;
-Appropriate overall design of self-levelling machines which today seem to be derived from machines designed for the plain.

-All combine harvesters must have ROPS;
-Safety belt shall be standard, even for passengers, if there is a seat for them;

-Seat belts as standard. ROPs (Roll over protection) as standard.
-Tyre-pressure indication in-cab and preferably automatic tyre inflation/deflation from cab.

Works on slopes

Some examples

ISO 4254-7

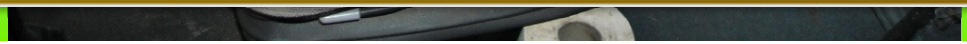
6.1. - Change wording to:

In case of rollover of a self-propelled combine harvester, the protection of the operator is considered sufficient if the design of the machine (shape and integrated structure, or cabin in combination with or with-out the structure), in combination with ~~anchorage points for~~ a restraining device, gives sufficient space for survival.

Add.

A safety signal for over-turns/stability warning for combines with slope compensation shall be provided at the operator's work station.

The alarm shall activated in the case of critical angle independent from the load



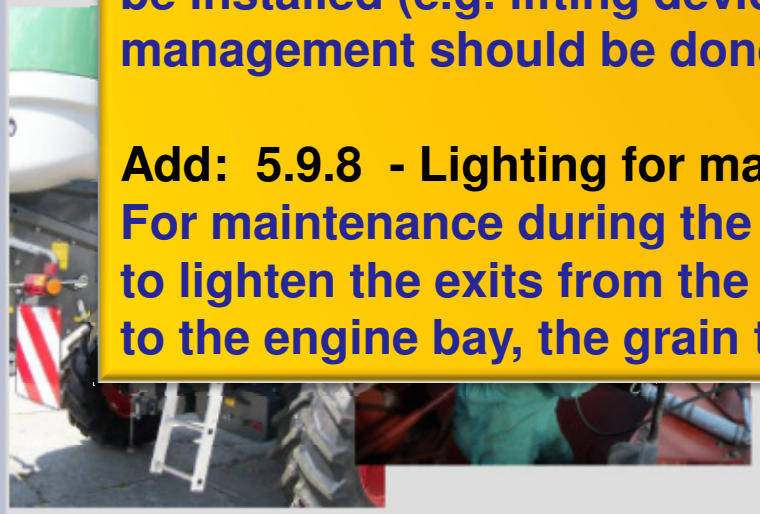
ISO 4254-7

5.3.12.1 –
Change wording to:
~~When the~~ The operator's work station ~~is~~ shall be equipped with a cabin, it shall meet the following requirements…….

Work phase: Inspections, cleaning, maintenance … (engine, chains, belts, fluid levels, refuelling, greasing, etc..)

Critical aspects / risks: **Risk of falls**

Suggestions *(D, I, S, UK)*



-Safe acce[illegible] to lubrication/maintenance points;

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greasing points

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ce-friendly with

d ladders and

engine bay platforms;

-improved ladders and handrails/ platform;

-automatic greasing systems should be fitted and or remote greasers.

Some examples

ISO 4254-7

5.9.3…. -

New: If filler necks for fluids located at a height of more than 1500 mm from the ground surface a supporting device for taking fluid container in the high position should be installed (e.g. lifting device, suitable place). Its management should be done by operators at ground level.

Add: 5.9.8 - Lighting for maintenance

For maintenance during the night means shall be provided to lighten the exits from the cab, the inspection accesses to the engine bay, the grain tank and side flaps.

Daily greasing

Some examples

ISO 4254-7

5.9.6.1 - Add before the first sentence

Grease points shall be reachable from the ground surface or connected to a grease distributor which is reachable from the ground surface. As far as …

ISO 4254-7

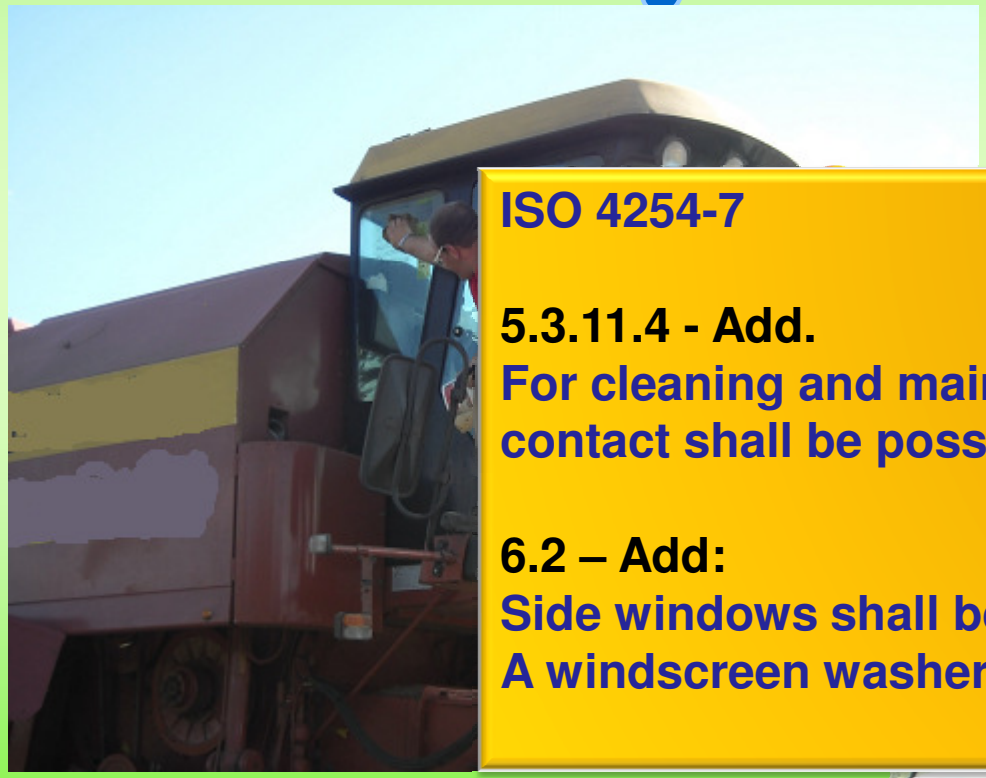
Some examples

5.9.1 – Change title: Tools
New
5.9.1.1 - Manual operation of individual assemblies
If special tools are required for manual operation, e.g. during the threshing mechanism of a combine harvester, they shall be supplied with the machine and their use shall be explained in the operator's manual [see 10.1.2 j)].
5.9.1.2 – Storage of tools
Provision for storage of a toolbox and the special tools if required shall be made on the machine. The storage position shall be in a dust free location away from hazardous areas and accessible from ground level.

4.9.4.6 - New
Efficient cylinder stops and hydraulic lockouts on the header system, activated when the engine is stopped, shall be provided to ensure the safe maintenance of the header to prevent crushing.
Two-step ram cylinder stops are required so the operator can reach the knife when ram-stops are applied.
……

Glass cleaning

Glass cleaning

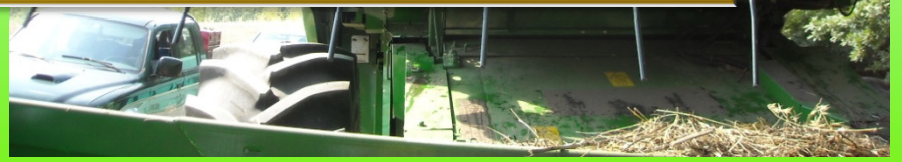


Some examples

ISO 4254-7

5.3.11.4 - Add.
For cleaning and maintaining three-point contact shall be possible

6.2 – Add:
Side windows shall be equipped with wipers.
A windscreen washer shall be provided .



Work phase: cabin access (operator station)

Critical aspects / risks: **Risk of falls, pinching injuries. etc….**

Sugges *(D, I, S, UK)*

Some examples

ISO 4254-7

5.3.5. - Add
The principal dimensions of the ladder shall be determined in accordance with ISO 14122-4, from 4.4.1 to 4.4.4.

5.3.5 – Add.
If parts of the boarding means are moveable, the operating force shall not exceed 250 N when moving from the start to the stop position.
If a telescopic ladder is provided there shall be a device that ensure the complete opening.

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-better handrails on ladders and platforms;
-suggest hydraulic ladders operated inside with cab controls;
-more room to move about e.g. bigger platforms;

Work phase: coupling and uncoupling of tting platform

Critical aspects / risks: inadequate

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Some examples

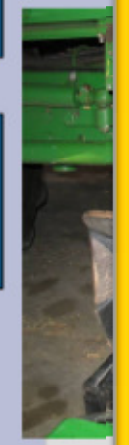
ISO 4254-7

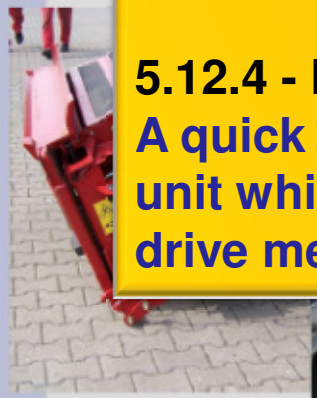
5.12.3 - New

Systems to ease the connection of the header (cutting platform) shall be provided. Crushing points between the header and the machine shall be removed. The header shall be projected in order to make it possible to deposit it on the ground for the next connection. Devices for a safe connection even with sloping ground, to avoid incomplete connection, must be provided. The control of the correct connection and the position of the locking system shall be possible from the cabin.

5.12.4 - New

A quick stop button shall be installed on the main control, e.g. joystick, unit which shall enable instant and complete disabling of all header drive mechanism.





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-All headers should be able to be dropped off on the ground and picked up again.
-Single docking standard.
-Automatic docking or cab-controlled.
.....

Need a power line sensors

ISO 4254-7

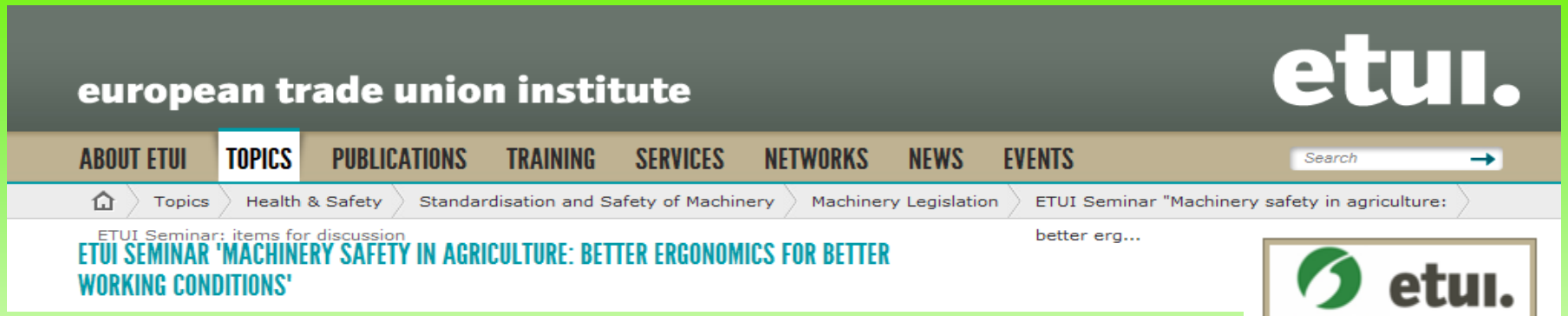
5.11.1 - Add

Combines shall be equipped with a sensor which detects overhead electric lines. The operator shall be informed by an audible and/or visible warning signal

… and ….

- Fire extinguishers
- Hot surfaces
- Operator’s manual
- …….

Feedback method



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