

Safety during agricultural maintenance and repair work



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Content of presentation

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- The material and methods used
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- Conclusions

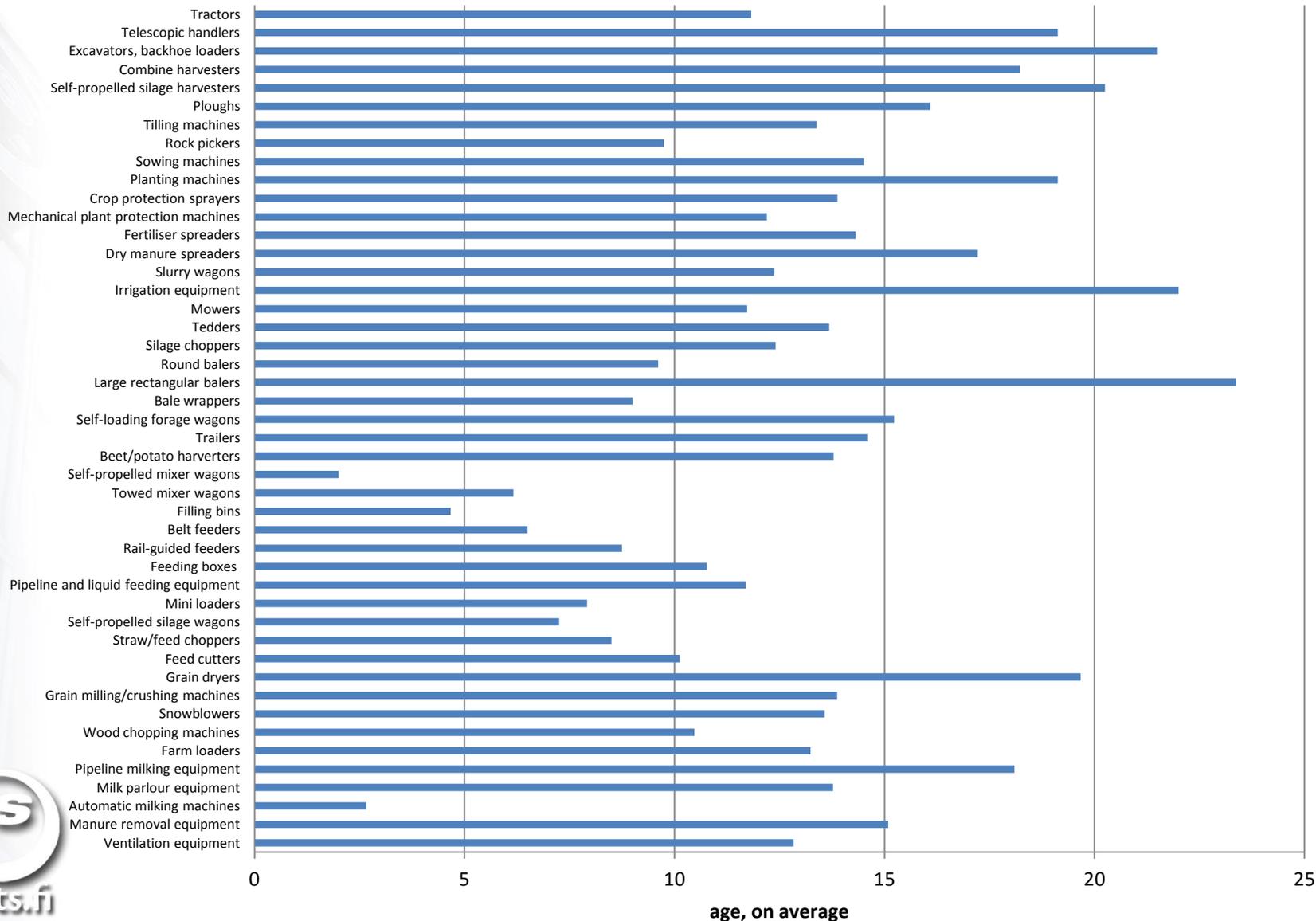
The aim of the study...

- was to survey current work-safety conditions during the performance of maintenance and repair work on farms, and to identify safe and efficient working methods for the tasks in question.
- Accordingly, objective was to increase safety at work and the efficiency of the production processes.
- The study was carried out in 2009–2010 and financed by the Foundation of Agricultural Machinery Research in Finland.

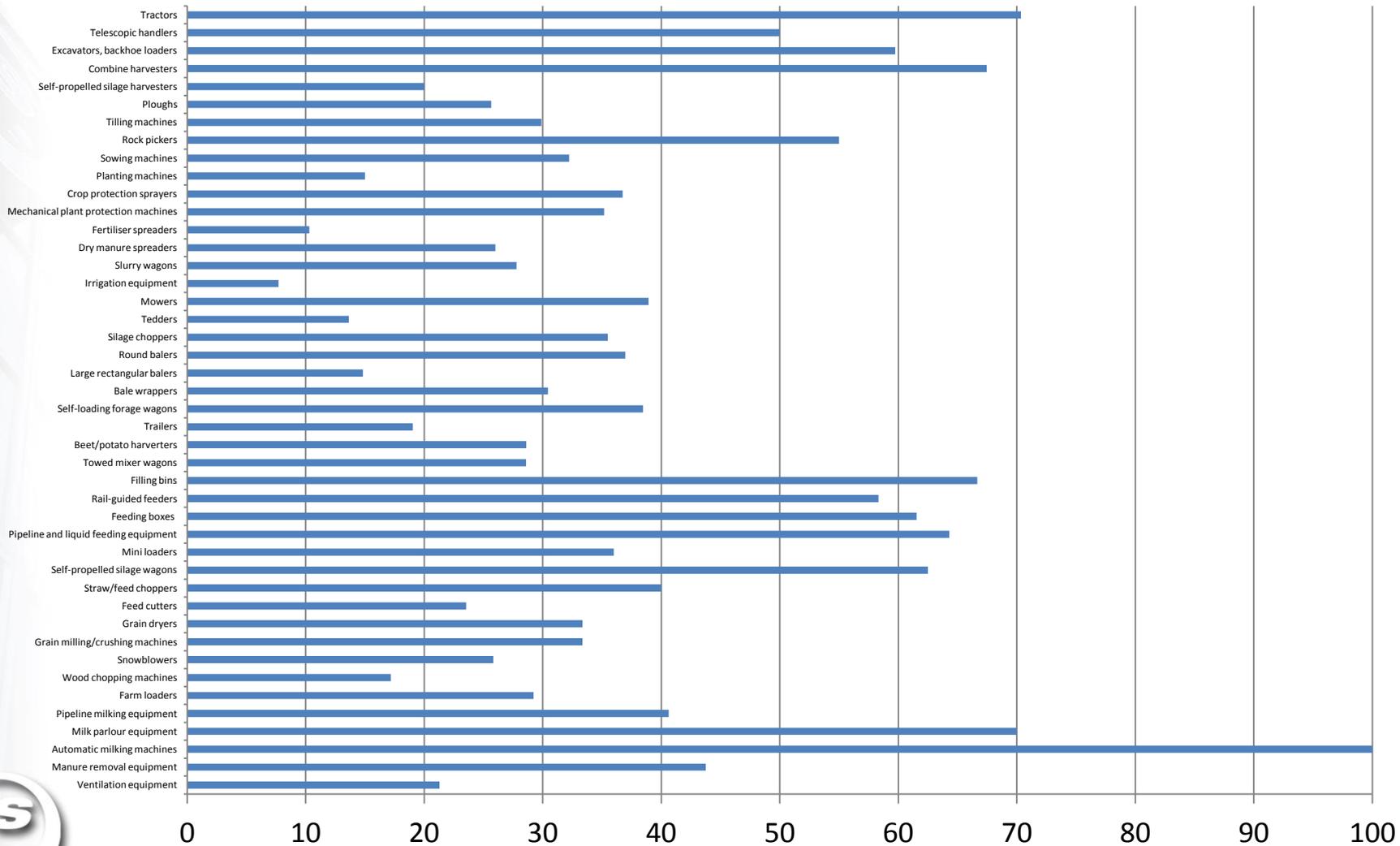
Material and methods

- Electronic questionnaires, interviews, and analysis of statistics and literature were the research methods used in the study
 - Questionnaires, interviews and literature were employed to determine the frequency with which maintenance and repair work was carried out on farms, as well as the practices, facilities and equipment used to perform this work
 - An electronic questionnaire was sent to a total of 1,000 agricultural entrepreneurs in different farm-size categories (response rate 33.2%) and to 215 maintenance contractors (response rate 39.8%)
 - The MATA statistics of the Finnish Farmers' Social Insurance Institution were analysed to determine the most common causes of accidents in maintenance and repair work
- Guidelines for safe maintenance and repair work procedures as well as examples of functional and safe farm garages and tools were drawn up on the basis of the research data
- In addition, a list was compiled of functional requirements to be used as a checklist in the planning of workshop maintenance and repair facilities and in the safe performance of work on the farm

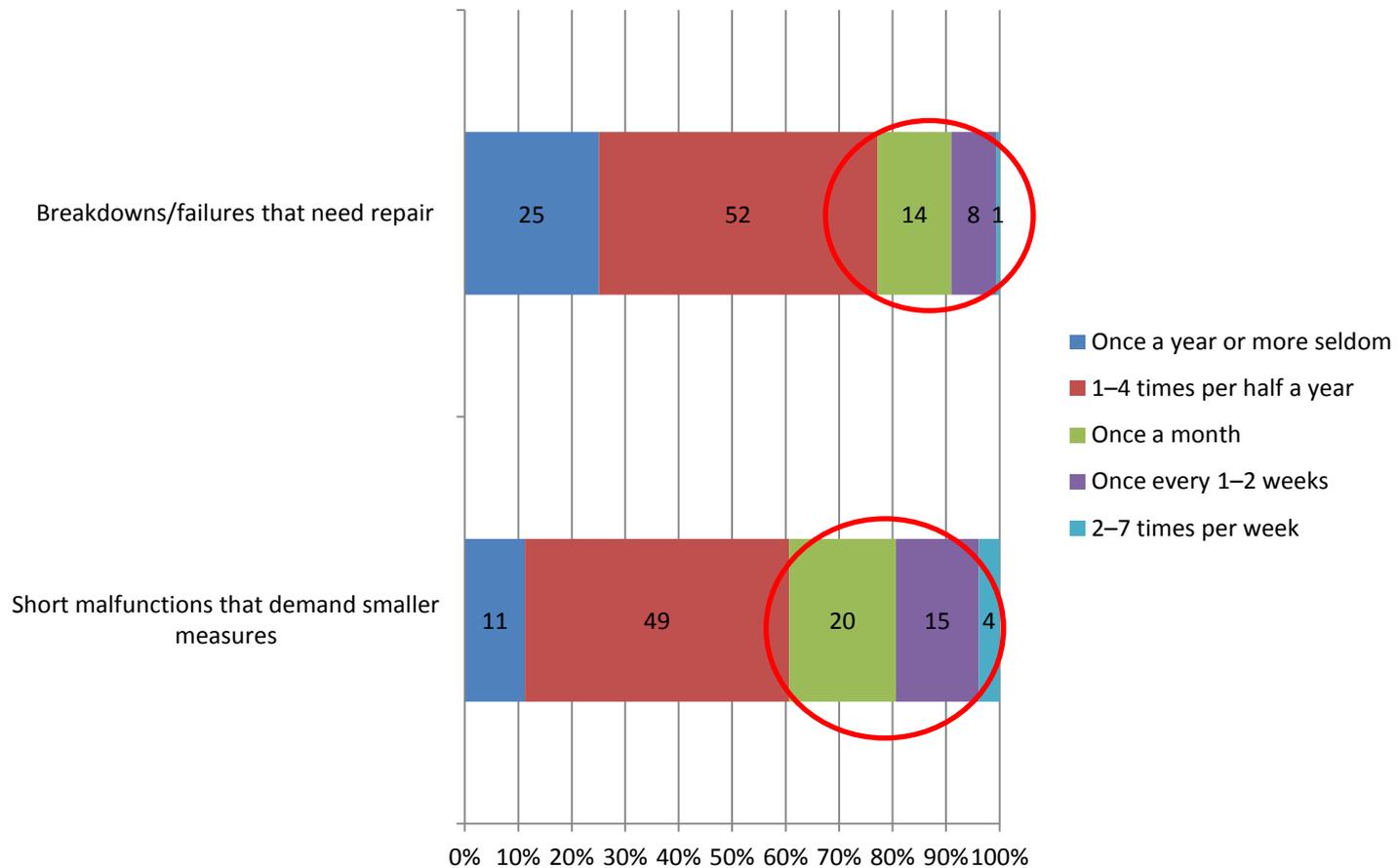
The machinery and equipment on many Finnish farms is relatively old



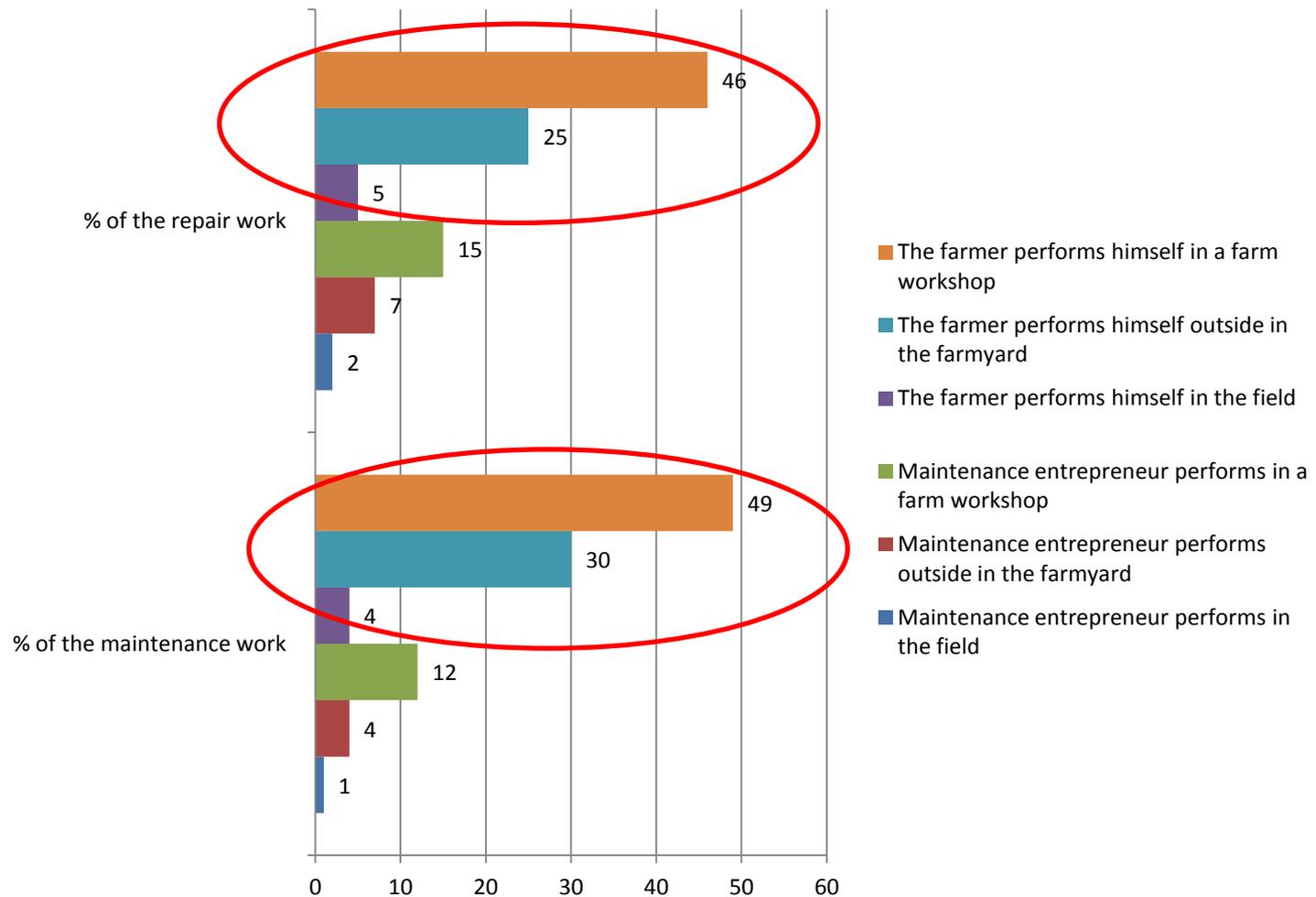
Machinery and equipment failures and breakdowns on Finnish farms yearly



Frequency of breakdowns and malfunctions in agricultural machinery



Who performs the maintenance and repair work on farms, and where



Accidents in machinery installation, maintenance or repair work

- According to the MATA statistics, most work accidents on Finnish farms occur during machinery installation, maintenance or repair work
- In 2007, 2008 and 2009, for example, the total number of work accidents recorded per annum was 770, 711 and 707, respectively, resulting in 18,000–25,000 sick-leave days per year
- Approximately one-quarter (26-28%) of these accidents were classified as serious, leading to over 30 sick-leave days
- In 2007-2009, average sick-leave length was 32–36 days
- ⇔ Maintenance and repair tasks are therefore clearly among the most dangerous operations performed on Finnish farms (relatively and also absolutely)

The number of agricultural farms in Finland was about 100,000 farms in 2005 and 62,767 farms in 2010 (Official Statistics of Finland, Information Centre of the Ministry of Agriculture and Forestry)

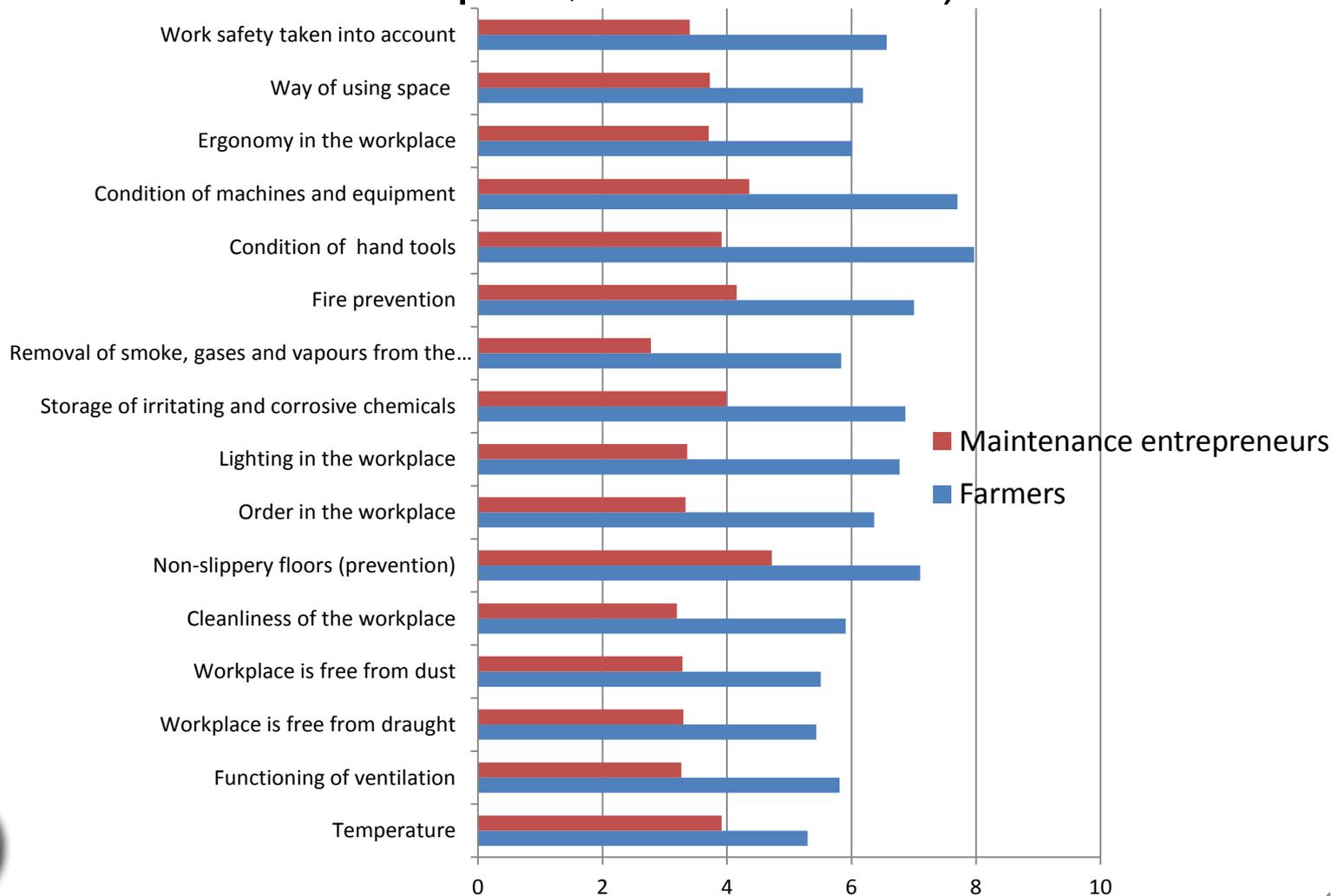
Factors endangering the safety during agricultural maintenance and repair work

- Handwork tasks ; dangerous working methods, working against instructions
- Working with hand tools
 - Handling objects
 - Lifting work=> Cuts, muscular distensions
- Varying and dangerous working environment and defective protection
 - Movements in workplace ⇔ order and cleanliness
 - Supporting the machines / blocking the movement
- Chemicals used
- Pressing schedule
- Broad spectrum of different machines, devices and working practices
- Working in the danger zone, working while the machine is operating or running, removing protective guards from equipment or bypassing protection systems, and working on an unsafe work surface

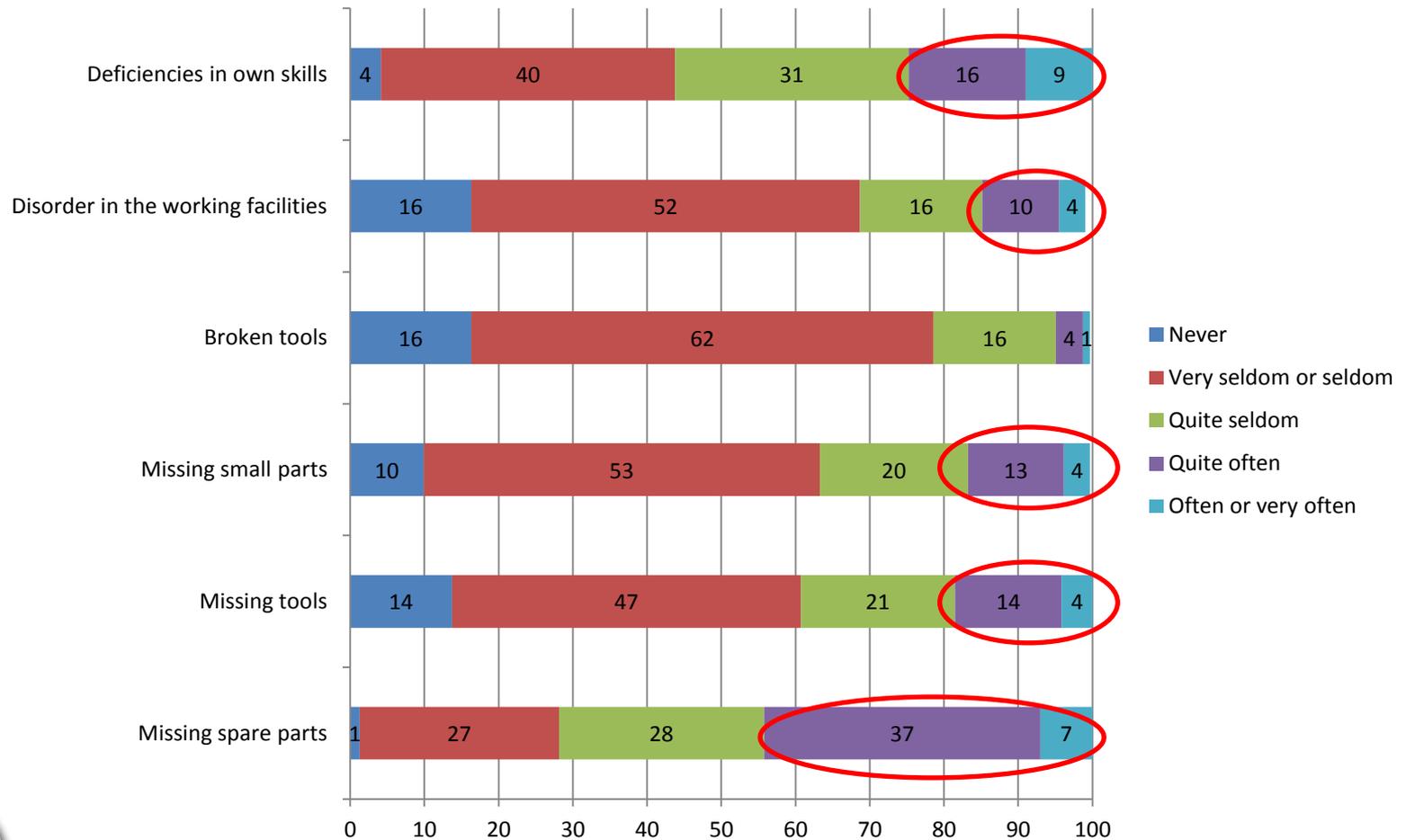
Common causes of accidents during agricultural maintenance and repair work

- Worn-out, low-quality or the wrong tools
- Incorrect use of tools
- Deliberate risk-taking or negligence
- Lack of or incorrect use of support structures
- Unexpected movement of the machinery
- Wrong working methods
- Disorderliness of the workspace
- Lack and difficulty of advance planning
- Insufficient identifying of risks
- Working directly on top of the machine
- Failure to wear personal protective equipment
- Incorrect protective equipment
- Poor working conditions

Work-safety level of the maintenance and repair facilities on farms as estimated by both the farmers themselves and the maintenance entrepreneurs (scale 1 = poor, 10 = excellent)



Causes of interruption during maintenance and repair work



21 % of farmers do not clean up or arrange the workshop after the maintenance and repair work

Attention should be paid to the following potential risks and hazards:

- Disorderliness in the workspace
- Falling, stumbling
- Fire hazard
- Chemicals
- Sharp machine and material parts
- Unexpected movement, falling, or starting of the machinery or any part thereof
- Lack of safeguards for the dangerous moving machine parts
- Working above floor level
- Worn-out, low-quality or wrong tools
- Splashes
- Electric shocks
- Dust
- Smoke
- Manual lifting of heavy loads
- Noise
- Insufficient lighting
- Cold working conditions

Common functional demands for maintenance and repair workshop and work, basics for planning 1/4

- A clear floor plan
 - Functional locations for stationary equipment
 - Storage and positioning of tools
 - Storage of materials (disorder often plays a role in accidents)
 - Room for spare part supply / spare part storage
 - Storage of fuels, oils and solvents separately, apart from the repair workshop (NB. hot work)
 - Restroom (what is realistic level)
- Machine-cleaning area close to the workshop
- Sufficient space for also the big machines fit in
 - In addition to the existing machines on the farm, the growth of the machinery size in the future should be taken into account

Common functional demands for maintenance and repair workshop and work, basics for planning 2/4

- Set places / positions for tools, equipment and spare parts (and returning back to their places after work)
 - For hand tools (large selection of tools, in good repair, high-quality, special tools and larger garage or metalworking equipment purchased jointly with other farms or borrowed)
 - Tool trolley, tool board or suchlike
 - For welding machines
 - For other big devices
 - For small parts and materials
 - For hardware
 - For hydraulic parts
 - For grease guns and pumps
 - For oils and other liquids, oil collection containers
 - For waste bins
- Safe, ergonomic work surfaces
 - Height, depth (working surface dimensioning)
 - Mobile working surfaces, carts
 - Ladders, scaffolds, trestles or suchlike for high work

Common functional demands for maintenance and repair workshop and work, basics for planning 3/4

- Machine warehousing nearby
- Safe, easy-care surface materials
 - Non-slippery (slips are common)
 - Cleanliness
 - Lightness
- Insulated rooms and additional heating
- Sufficient number of electrical outlets (rather too much than too little)
- Several connections for compressed air or a hose reel with a sufficient range for different working areas, including outdoors
- Adequate lighting
 - General lighting (use of light roofing)
 - Spotlights

Common functional demands for maintenance and repair workshop and work, basics for planning 4/4

- Good ventilation
 - Combustion gases, fuels, oils, solvents etc.
- Fire safety
 - Surface materials
 - Waste management
 - Storage of fuels, oils, solvents separately, apart from the repair workshop (NB. hot work)
 - Place for hot work
- Means of lifting heavy loads
 - Load-bearing beam, rail hoist or suchlike
 - Mobile hoist
- Supports
 - Axle stands

Conclusions

- Because work-related accidents in agriculture occur most frequently during maintenance, repair and installation work, special attention should be paid to the condition, functionality and appropriate equipping of the repair facility, as well as to the farmer's ability to perform repair and maintenance work.
- It is important to identify in advance the risks entailed by maintenance and repair work, and if possible eliminate or reduce these risks.
- There are obvious shortcomings in the working facilities from the perspective of both work safety and functionality (work efficiency)
- A great number of functional demands must be borne in mind when planning and building a workshop for maintenance and repair work so as to enable the work to be performed safely, efficiently, and without risks to health

Conclusions

- Since the majority of accidents during maintenance and repair work occur during fault situations, more attention should be paid to the preventative maintenance and servicing of machines so as to avoid unnecessary malfunctions and interruptions during their operation
- Systematic and timely machinery maintenance, performed in suitable facilities and with the appropriate tools, reduces the requirement for repairs, improves work safety and ensures the productivity of the machine work
- Safe and efficient working methods should be thought out in advance for situations where a malfunction occurs, and particularly where work is interrupted by machine failure
- Where repair skills or time are lacking, it is better to outsource the work to professional maintenance contractors



Thank you!

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18. Arbeitswissenschaftliches Kolloquium

