RISK ASSESSMENT FOR MAINTENANCE HAZARDS AND IDENTIFICATION OF SAFE MAINTENANCE METHODS

1. Case metadata

- ***Country/ies of origin:***

Turkey

- ***Year of publication by agency:***

2011

- ***Sector:***

C29.1 - Manufacture of motor vehicles (NACE II)

- ***Keywords:***

24401C Case studies

24361C Good practice

21401C Maintenance

55261D Maintenance worker

21321C Equipment

19641D Risk assessment

20641D Worker participation

41681 B Hazards in plant, machinery and work equipment

20201D Safety policies and procedures

47321C Work accidents

2. Organisation involved

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In 1959 Otosan was founded as Ford assembler in Turkey and in 2001 the Kocaeli plant was launched with Transit production. The Ford Otosan Kocaeli plant for light and medium commercial vehicles employs 7305 workers (2010) and is certified according to ISO 9001, ISO 14001 and OHSAS 18001.

3. Description of the case

3.1. Introduction

Regular preventive maintenance and planned inspections are a standard processes at the company conducted in a timely manner. Appropriate checklists including safety related items are used. A risk assessment is conducted and documented for every specific job.

This ensures:

- all machinery & equipment are in good operational condition,
- engineering controls are in place,
- regulatory compliance, (eg. for lift equipment and pressured vessels),
- timely resolution of possible safety problems identified during the preventive maintenance process.

Specific risk assessment is sometimes required for corrective and reactive maintenance tasks which cannot be foreseen during regular maintenance activities. These can be repairs due to breakage and failure. These tasks are more risky than regular maintenance.

The hazard identification for maintenance tasks shall be conducted in advance of the activities by the employees who will carry out these tasks and must be shared with all involved employees. This is a process to identify possible hazards and associated control measures to safeguard regular and maintenance workers.

3.2. Aims

- Conduct comprehensive risk assessments for maintenance operations involving all stakeholders
- Ensure safe maintenance operations in Ford Otosan.

3.3. What was done, and how?

During regular and reactive maintenance tasks, maintenance workers may face high risks that may lead to severe injury or illness, such as:

- trapping extremities by moving parts of machinery,
- struck by falling / moving / sliding / swinging objects,
- contact with sharp objects,
- falls from heights,
- slips, trips, falls at low level,
- exposure to hazardous substances,
- fire or explosion,
- electric shock or electric arc,
- exposure to dust, fume, vapour, gasses, or biological agents.

Most of these high risks can be eliminated or significantly reduced by physical improvements, such as:

- additional interlocks against interfaces between other installation, machinery or process,
- installing appropriate life lines for fall protection,

- installing maintenance platforms,
- covering pits,
- removing stumbling obstacles,
- relocating air and hydraulic valves outside the fences.

The company has established a special risk assessment process in order to eliminate or at least reduce the risk of potential severe injuries during various maintenance activities at machinery and equipment.
To this end maintenance risk assessment teams were established including skilled maintenance workers, area safety experts and manufacturing engineers in every production area. The company has conducted risk assessment training including theoretical and shopfloor practice for these teams.

Each production department has the responsibility to organise the risk assessment. They have to prepare their individual full year maintenance risk assessment plan. The teams plan in the beginning of the week which equipment they will need in order to conduct the maintenance risk assessment for that week. Every production area has a monthly follow up meeting to monitor the progress.

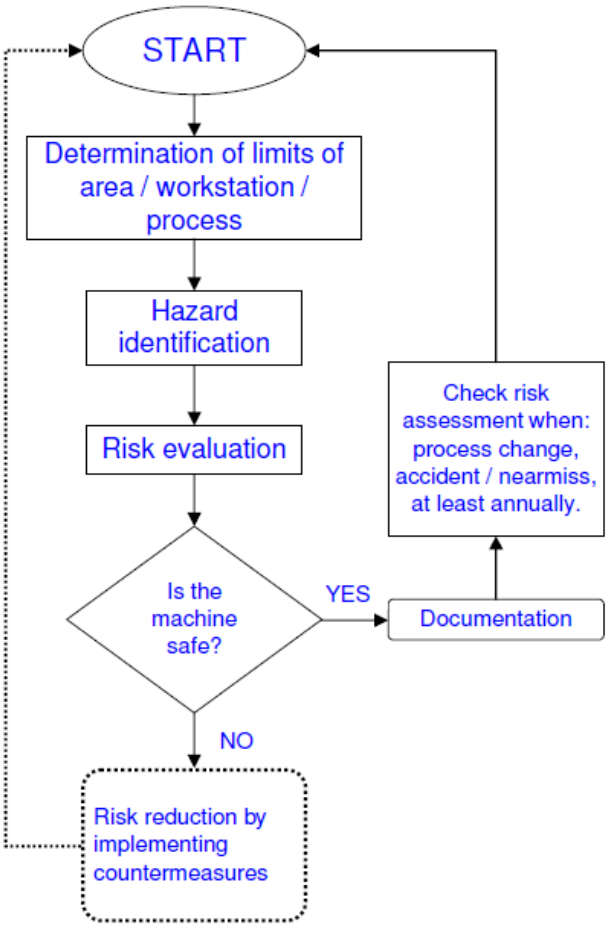

Fig. 1: Risk assessment system in Ford Otosan

Hierarchy of controls for identification of countermeasures:

- Elimination
- Engineering control (e.g. additional safe guarding)

- Administrative controls (e.g. health surveillance)
- PPE
- Job procedures

3.4. What was achieved?

Example 1: Maintenance risk assessment for the stamping area – maintenance work at press crown

Although the crane operator can see the press crown, he may not see the maintenance operators who have occasionally to work on the press crown. The crane bridge may strike the maintenance workers. Identified risk: struck by moving object (crane bridge), fall from heights.

The following countermeasure was developed by the team: a press crown maintenance gate was installed with an interlock to the crane (enables multiple powerlock out for up to 6 individuals).

Fig. 2: Switch on the maintenance gate

Example 2: Maintenance risk assessment on the stamping area – maintenance work at a press slide

One maintenance worker (A) has to observe the machine conditions or do troubleshooting for minor faults inside the press slide. Another maintenance worker (B) operates the system manually due to radio communication with the first operator. They don't see each other. They communicate via radio set. Identified Risks: (i) trapping extremities by moving parts of machinery, (ii) struck by sliding units.

The following countermeasure was developed by the team: An activation switch was provided as a positive control for operator A inside the press slide. Only after operator A pushes the activation switch (deadman switch), operator B can operate the press slide units.

Fig. 3: Operator A inside the press slide with activation switch

Further examples:

- An uninterrupted life line for crane catwalks was installed; before workers had to disconnect the safety harness at steel structure beam points.
- Installing a sliding electrical fastener control panel in order to avoid working on a ladder.
- Development of a safe cable cover cutting tool in order to avoid contact with sharp objects.

The plant safety team is involved in the acceptance of every improvement / counter measure (such as, new machinery, modifications to equipment). A safety acceptance form is signed by the plant safety team prior to start any new / modified equipment. After safety acceptance the following steps are taken, to ensure all maintenance operators are aware of the improved state:

- “Single Point Lessons” distributed
- Work instruction sheets prepared
- Related risk assessments updated
- Training conducted for all affected personnel about the improved state.

Effectiveness of results:

Several technical safety improvements were implemented so far during the plant wide maintenance risk assessment activities. The lessons learned gained during this initiative were included in machinery specifications for upcoming new projects.

Ford Otosan leadership promotes health and safety improvements. Maintenance employees are identifying maintenance hazards and proposing corrective actions. Maintenance employees risk perception has significantly improved.

3.5. Success factors

An essential factor was the establishment of cross functional risk assessment teams with involvement of maintenance workers. These know the equipment best, they know what kind of repair they have to do, they know the method /process of repairing.

Another factor was that the plant safety team is involved in the acceptance of every improvement / counter measures, such as new machinery and modifications to equipment.

3.6. Further information

The national jury for the Good Practice Award in Turkey commended the case, stating: “It is a practical solution for a safe maintenance problem faced while production process. Identifying the problem and finding the solutions are a result of OHS system. Employees take part in the system considerably. Transferability of example to other companies is very high.”

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3.7. Transferability

The approach is very much based on an integrated management system; however, the idea of the risk assessment teams could also be applied in smaller companies without having management systems in place.

4. References, resources: