

SHEET METAL STAMPING DIE TRANSFER AND TURNOVER CRANE OPERATIONS AT STAMPING AREAS

1. Case metadata

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42881E Crane

14001E Engineering Control

2. Organisations involved

Ford Otomotiv Sanayi A.Ş.

3. Description of the case

3.1. Introduction

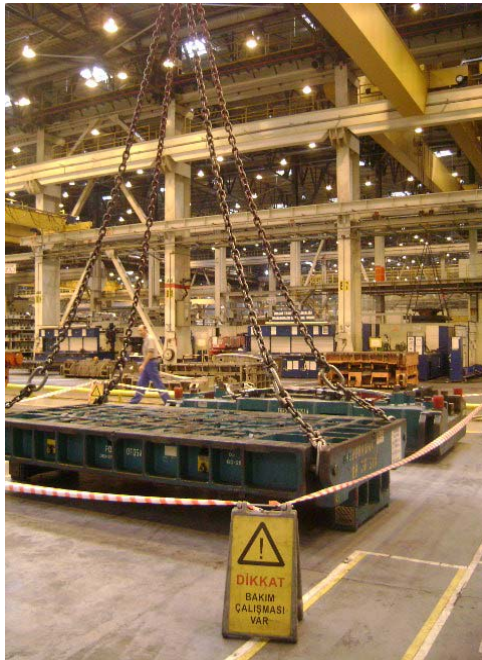
Whereas routine overhead crane operations are performed by a single crane driver at the stamping area at Ford Otomotiv Sanayi A.Ş., turning over stamping dies for regular maintenance purposes is performed by two employees. The crane driver and a second employee (slinger) who is assisting in the rigging and hooking of the load.

The crane driver and the slinger attach chains to die lifting pins. Thereby, the crane driver has to be positioned for the best view of the crane and to keep the load in sight and stay at a safe distance, but close enough to ensure safe handling. The hands of the slinger, assisting in the rigging and hooking of the load, must be clear before lifting can begin. The crane driver has to ensure that crane hooks, slings, other attached devices and their loads can clear obstacles on the floor before attempting to move the crane.

The crane driver and the slinger have to have appropriate eye contact prior to commence crane operation. If the crane driver operates the crane without confirmation from the slinger, the slinger has no control of the crane and both employees could be trapped between or struck by sliding, swinging or moving objects, such as the lifted load (see figures 1, 2 and 3).

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Figures 1. 2 and 3. Sliding, swinging or moving objects



Source: Ford Otomotiv Sanayi A.Ş.

3.2. Aims

In order to reduce the risk of potential (fatal) injuries, the employees of Ford Otomotiv Sanayi A.Ş. wanted to make sure that the crane driver and the slinger have eye contact prior to the crane operation. Moreover, the technical control of the slinger had to be provided prior to any crane movement. However, according to various crane suppliers, technical solutions for a second employee control of crane operations could not be found in the market.

3.3. What was done, and how?

First of all, job observations were performed for the turnover operations. Thereby, safety and ergonomic hazards as well as potential risks were identified at each work step. The following hazards during die turnover and transfer operations with overhead crane were identified:

- full body trapped between two objects (stamping dies) - risk of fatality
- struck by falling / moving / sliding / swinging object
- hand / finger trapped between two objects (e.g. chain and pin)
- struck to an moving object
- contact with sharp objects
- slip, trip, fall to same level

Among other occupational risks these hazards were documented in the so-called quality process sheet and a risk assessment was carried out. Thereby, the likelihood of every specific risk was classified in five categories: “extremely unlikely” (rating of 1 for risks occurring once a year), “unlikely” (rating of 2 for risks occurring once all three months), “likely” (rating of 3 for risks occurring once a month), “very likely” (rating of 4 for risks occurring once a week) and “almost certain” (rating of 5 for risks occurring once a day). In addition to the likelihood of the occurrence of a specific risk, the severity of a specific risk had to be rated. Thereby, the degree of potential harm of the risks to which the workers were exposed had to be rated: “minor injuries” (rating of 1 for non serious injuries, illnesses, or damages), “moderate injuries” (rating of 2 for injuries, illnesses, or damages in which first aid with medical treatment was necessary), “serious injuries” (rating of 3 for lost time accidents), “major injuries” (rating of 4 for serious lost time accidents), and “catastrophic injuries” (rating of 5 for fatalities and/or multiple, total disabilities). In the next step of the risk assessment process the rating of the likelihood of the risk was multiplied by the rating of the severity of the risk. The results were marked in the risk factor matrix. With the help of this risk factor matrix, every risk can be categorized in one of the three risk categories. Thus, the specific risk is either regarded as “high”, “medium”, or “low” depending on the result of the multiplication.

In order to reduce the occupational risk, specific countermeasures such as e.g. personal protective equipment were identified. The necessary permanent countermeasures, the responsible personnel name as well as the target date were documented in the quality process sheet.

With regard to the turning operation a new system was developed by the maintenance team of the stamping area at Ford Otomotiv Sanayi A.Ş., in order to provide the slinger with technical control prior to any crane movement. A radio controlled confirmation switch was serially connected to the crane main control unit. Thereby, the crane could either be operated by a single or a two employee control. If the crane operation was carried out by the crane driver and the slinger, the slinger took the confirmation switch from the dock kit. The crane driver could not operate the crane, unless the slinger activated the confirmation switch. If any risk arose during the operation, the slinger was able to stop the crane movement by deactivating the confirmation switch (see figure 4).

Figure 4. Possibility to deactivate crane movement



Source: Ford Otomotiv Sanayi A.Ş.

In case of single employee crane operations carried out by the crane driver, the confirmation switch was plugged into its dock kit. Then the confirmation switch automatically sent the confirmation signal and the crane driver could move the crane by the use of the crane radio controlled unit.

After developing the new turnover operation system providing positive control to the slinger prior to any crane movement, the improvement including the work steps of the new turnover operation system as well as the realization date were documented in the quality process sheet and approval signatures were taken.

3.4. What was achieved?

- A confirmation switch was connected serially to the crane control unit, in order to provide a positive control to the slinger prior to any crane movement. The costs for the implementation of the confirmation switch were about EUR 1500 per crane.
- The innovation prevents the risk of potential fatal injuries during two employee crane operations such as die turnover operations.
- The innovation was welcomed by the crane drivers and the slingers on the stamping areas.
- The crane manufacturer agreed on the technical change of crane control and accepted that it complies with essential safety and health requirements according to Annex 1 of the Machinery Directive 98/37/EC. The patent is still pending. However, the Turkish Patent Office for the

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technical improvement of crane controls officially confirmed that this innovation is unique in its function and improves the safety during overhead crane operations.

- The second employee control by the crane confirmation switch was implemented at five individual cranes operating at the stamping area at the Kocaeli plant. The remaining cranes at the plant were operated by single crane control.
- This technical improvement was also communicated to other Ford Motor Company Plants worldwide as an occupational safety best practice.

3.5. Success factors

The employees highlighted the requirement for improvement that provides a control for the second employee at risk assisting in the rigging and hooking of the load.

Besides employee consultancy and involvement, appropriate risk assessment as well as problem solving techniques (e.g. brainstorming, fishbone analysis, etc.) could be regarded as the success factors that enabled risk reduction by technical improvement and appropriate controls.

Several meetings were held with shop floor employees to discuss preventive measures to reduce risks during the die transfer / turnover process.

The second employee control of a crane movement is the only valid technical solution in the market.

3.6. Further information

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3.7. Transferability

The second employee control by the crane confirmation switch could be implemented at overhead cranes where two employees are necessary for the operation and one of them has no control in case of unexpected crane movement. This preventive measure can be easily implemented to any crane with control of two employees.

4. References, resources:

Information provided by the company/organisation in the framework of the Good Practice Award Competition 2008/2009.