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A POSSIBLE APPROACH TO SECURING FEWER AND SAFER INTERVENTIONS AT DANGEROUS MACHINES

Introduction

Major injury accidents at dangerous machines continue to happen. This discussion document suggests a strategy that employers can adopt to reduce the number of times employees need to intervene at dangerous machines and to ensure that any interventions that cannot be avoided are performed safely.

Step 1. Identifying the tasks and setting priorities for action

1.1 Identify the machines and items of plant at which people potentially approach dangerous parts (e.g. for setting, making adjustments, cleaning, clearing blockages, maintenance and inspection).

1.2 For each of these machines and items of plant, list all the tasks that are known to necessitate removal or disturbance of guards/safety devices or working inside guard enclosures (e.g. for setting, adjusting, cleaning, clearing blockages, maintaining, inspecting).

1.3 Involve those people who carry out these tasks in this process. Include both operational and maintenance tasks. You should also seek to identify those tasks, including the infrequently performed ones, which could *potentially* involve working inside enclosures or removing/disturbing guards or safety devices.

1.4 To do this you will need to observe the tasks as they are carried out ideally getting the operator or fitter to talk you through them. Look out for situations in which the working environment, plant layout, access etc make the task awkward such that it would be “easier” to do from inside the guard or with the guard or safety device removed or disabled. Operators and maintenance personnel are human!

1.5 For each task do a Preliminary Risk Evaluation (PRE). Ask what the worst foreseeable outcome would be if things went wrong and allocate a hazard factor accordingly. Ask how likely this is to happen and allocate a probability factor accordingly. Multiply the two factors to give a Preliminary Risk Factor (PRF). Rank all the tasks accordingly to their PRFs. Use the risk ranking to decide which tasks to address first.

Stage 2. Challenging the status quo

2.1 Using a team approach, and starting with the high-risk tasks, ask if the task really has to be performed at all. Include on the team independent people who are not involved with the day-to-day performance of the task or operation of the machine or item of plant. Ideally, someone from outside the plant or department who is willing and able to challenge the way things are done at present. Also include on the team the people who perform the tasks.

2.2 Challenge whether the task really needs to be done that way. Can it really only be done by working inside the guard enclosure, removing or disturbing guards or safety devices etc? For example, can the hardware and controls be modified to allow adjustment from outside the guard enclosure? Can automatic feeding systems be installed? Can internal lighting systems and CCTV be installed? Can layout and access be improved?

2.3 Filter out those tasks that are not really essential and those that can be done a fundamentally different and safer way. Decide the alternative methods and changes to process, hardware, layout, access and controls that are needed. Then go to 4.1 below.

Step 3. Detailed risk assessment including task analysis and error analysis for any remaining tasks that still appear to require work inside guard enclosures or guards /safety devices to be removed or disturbed.

3.1 For those tasks not filtered out at step 2 above, and starting with those tasks that have the highest PRFs, use a team approach to carry out task analysis (e.g. hierarchical task analysis). The team should include the people who perform the tasks, those who supervise them and maybe the H&S professional. Be aware of the possibility of different shifts carrying out the same task in different ways. Don't assume that the analysis you carry out for a particular task carried out by shift 'A' will necessarily hold good for the same task performed by shift 'B'.

3.2 Use task analysis to break each task down into its component task steps.

3.3 Carry out detailed risk assessment of each step. Include predictive human error analysis to ask "what if?" questions using a standard list of potential error types. Use the results of this to decide how to modify the plant, hardware, environment, communications, system of work etc to reduce the likelihood of error and to make the system error-tolerant (i.e. so that if an error is made the consequences are not serious).

3.4 Explore the history of past rule and procedural violations in relation to each task. Look at past accident and near miss data. Ask the people who perform the tasks about past practice. This will require an open, honest and "no blame" approach using a team of people. Include on the team those people who perform the tasks.

3.5 Explore the potential for future rule and procedural violations using knowledge of the causal factors that contribute to them (from HSE publication HSG 48 "Reducing Error and influencing behaviour").

3.6 Decide what needs to be done to influence those factors. Involve the workforce in this.

Note. One of the factors that influence procedural violations is the extent and quality of the monitoring and checking carried out by managers and supervisors to check/confirm compliance with safety critical rules and procedures. Use the results of risk assessment to decide which rules and procedures need to be monitored, with what frequency and in what depth (obviously controls for higher risk activities need to be checked more frequently and in greater depth with more detail recorded). Involve the workforce in deciding the arrangements for carrying out this monitoring and involve them in carrying out the monitoring checks. Record the results of monitoring checks. Provide feedback to the workforce. Use the results to set improvement targets and involve the workforce in this too.

Step 4. Plan and implement improvements

4.1 Do a final check on the proposed improvements to confirm that they include sufficient "lines of defence". Confirm that there are no situations in which you will still be operating "one step from disaster". Ask if, under the planned improved conditions, there are still circumstances in which you are relying on a single individual to get it 100% right 100% of the time to prevent a serious accident. If you conclude that there are still insufficient lines of defence you need to repeat the steps above and you may need to obtain expert assistance.

4.2 Plan and implement the improvements. Use the results of PRE to determine the priorities for action and to schedule the improvement work (i.e. schedule actions that achieve the greatest reduction in risks to be implemented first).

Step 5. Check, measure/monitor and review

5.1 Put in place procedures for managers/supervisors to perform formal measurement / monitoring checks at suitable intervals to confirm that the improved arrangements are working. Involve the workforce in these monitoring activities.

5.2 Are new hardware and control systems working properly, are guards, safety devices kept in place and are they being properly maintained? Are the improved procedures and safe systems of work being followed properly by all shifts? Deciding what needs to be checked, with what frequency and in what depth should be based on the results of risk assessment (with the hardware, controls, procedures and safe systems of work for higher risk activities being checked more frequently, in greater depth and with more detail recorded).

5.3 Record the results of this performance measurement, analyse them and use them to set targets for further improvement. Provide the workforce with feedback. Give them the results of these performance checks and involve them in setting agreed improvement targets.

Having completed the above actions for the tasks with the highest PRFs repeat the exercise for the medium risk tasks and after that for the lower risk tasks.

Note**. Nothing in the foregoing should be taken to imply that it is acceptable for a person to disturb or remove guards or safety devices to allow approach to **dangerous moving parts of machinery.** It isn't. Effective controls are required including effective energy isolation and lock off procedures. However, performing the above steps using an open and honest approach should help you to identify weaknesses and shortcomings with existing controls. You need to identify and examine what **actually happens** in practice. This may be different from what written procedures say **should happen** and from what managers believe **does happen.