

Design ENGINEERING

8 STEPS FOR OBTAINING HYDRAULIC POWER PRESS SAFETY COMPLIANCE

Bosch Rexroth gives eight steps to follow in order to best comply with hydraulic power press safety.

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By **Design Engineering staff** | March 19, 2009



In February, Bosch Rexroth Canada offered a free Hydraulic Power Press Safety seminar on how to achieve hydraulic press worker safety that meets regulatory standards. It focused on applying specialized systems, techniques and components to maximize safety and regulatory compliance for managers, plant engineers, maintenance specialists and machine builder design engineers in any industry that uses large hydraulic power presses, including

automotive, commercial goods and others.

To enlighten those who did not or could not attend, seminar presenter **Steve Storoni**, Industrial Hydraulics Engineering Manager at Bosch Rexroth, gives *Design Engineering* readers eight steps to follow in order to best comply with hydraulic power press safety:

1. Know your role

The ultimate responsibility and liability for a safe hydraulic press system lies with the employers, owners or lessees of the machine—however, each contributing party to the system are liable for their individual supply.

2. Understand the current legislation, policing method and standards

In Canada, relative legislation is documented via the OHS Act (Occupational Health and Safety Act, R.S.O. 1990, c. O.1), specifically OHS R.R.O. 1990, Regulation 851 for industrial establishments. The Ministry of Labour's (MOL) industrial health and safety inspectors and engineers enforce the laws and can enter an industrial establishment without advanced notice. Applicable standards for hydraulic presses are covered by CSA Z432 (a type B standard) and by CSA Z142 (a type C – machine-specific standard).

3. Know when a PSR is required

There is no such thing as “grandfathering” a machine. If someone is injured or killed by a machine, litigation will refer to the latest and greatest safety standards and regulations. When a new machine, relocated machine or modified machine is considered, a Pre-Start Safety and Health Review (PSR) is required before the machine can be operated.

It is best to have a PSR completed first on a machine that the employers, owners or lessees are planning to modify to meet current safety regulations since the professional engineer which will be engaged to produce the PSR report have their own personal interpretation of the standards and thus it is best to sort through the correct solution with them and the potential sub-suppliers prior to purchasing any goods and/or modifying the machine to ensure that all concerns are attended to in the planning stage.

A second PSR is not required after implementing the changes identified in the first report (unless the MOL had locked out the machine and requested that a PSR be done, in which case, a review by a Professional Engineer of the final work completed is necessary before operation is allowed). The completed PSR report and documentation which supports the changes implemented are to be submitted by the employers, owners, or lessees of the machine to the Joint Health and Safety Committee (JHSC) or Health and Safety Representative (HSR) before first use of certain hazardous equipment, or equipment used in hazardous processes, and the report and supporting documentation must be kept readily available in the workplace for review on request by either the JHSC, HSR, MOL inspector, or employee.

4. Know what a PSR covers

It is very important to note that strictly speaking, a PSR will only cover concerns/observations relative to the provisions and circumstances covered in Table 2 (O.Reg. 528/00, s. 2.) of OHS R.R.O. 1990 Regulation 851. However, all aspects of the specific standard governing this type of machine (CSA Z142) must be followed and achieved. Someone seeking a PSR should discuss with the Professional Engineer the details of the scope of the PSR report and request that they expand them as necessary since the employers, owners, or lessees are still responsible to meet the balance of the standard or regulation.

5. Understand how a risk assessment identifies which degree of safety an operation requires

Presently the resultant risk assessment will identify the degree of safety via a category rating ("B" being the lowest, followed by a range from "1" to "4" where "4" is the greatest). Newer standards are presently under development which moderate this category rating to achieve a "performance level" rating, reference EN ISO 13849-1 which illustrates a measure from "a" to "e" where "e" is the greatest. This adjusted rating takes into account some additional metrics for assessing the individual components that make up the safety system such as; the mean time to dangerous failure (MTTFd), the possibility to detect failures (DC), and a consideration for common cause failures (CCF).

Further to this, specifically with respect to the assessment as it involves programmable electronic safety, another new standard, reference EN IEC 62061 identifies a "safety integrity level" (SIL), which ranges from "1" to "3" where "3" is the greatest. The SIL can be related to the performance level. Obviously the use of known, high-quality components is recommended to ensure that they perform optimally as a part of the overall safety system.

6. Select knowledgeable sub-suppliers with quality products

After a PSR has been completed, the employers, owners, or lessees of the machine will begin their search for sub-suppliers that will provide circuit and/or mechanical upgrades. To make this endeavour successful, the incumbent should seek out partners that are well known in the drive and control industry since both engineering considerations and the availability of a full spectrum of safety approved components is desired. Qualified suppliers will be able to provide intelligent feedback to the PSR consultant as well as declarations of conformity for either the individual components or circuit solutions (e.g.. manifold assemblies) that they provide. These will aid the PSR consultant greatly with their part in the process. These types of qualified sub-suppliers are typically global players and it is best if their roots are found in Europe, where the EU is typically driving the latest and greatest in terms of safety standards, which drives these organizations to continue to provide the market with the latest and greatest, bleeding edge technologies integrated into their products to achieve and continue to drive such standard developments.

7. View the safety upgrade as an opportunity to improve your machine's operation in parallel

In keeping with the previous point, qualified sub-suppliers will endeavour to identify inefficiencies in the existing circuit with respect to optimized control. Hence, such suppliers will not only provide a quotation to achieve the safety upgrade, but will also suggest changes which can improve the

machine's operation in terms of providing greater efficiency or control. The outcome would be an upgrade which provides for more efficient energy use in the operation, decreased scrap rates, increased part quality, decreased cycle times, and safety compliancy. It often doesn't cost a great deal more to make these additional changes when you're making modifications anyway, and the ROI can often be realized over short periods of time (in the magnitude of months).

8. Don't forget that a safe and reliable system is only possible by having a maintained system

It is estimated that 90 percent of all hydraulic system failures can be attributed to contaminated hydraulic fluid. As such, it is mandatory (and CSA Z142 does note this) that a qualified maintenance program be applied to a machine in order to keep the pressure medium within its operating parameters, among other aspects. As referenced earlier, a qualified sub-supplier will also have an extensive service network and should be able to provide a variety of products and services related to preventative maintenance programs to aid the employers, owners, or lessees of the machine with this ongoing endeavour.

To learn more about the Bosch Rexroth 2009 Seminar Series, and to register for the Hydraulic Power Press Safety event, visit www.boschrexroth.ca/seminars.

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