Functional Safety of Machines

Significance for Hydraulic Valves

Comprehensive requirements with respect to operational safety are made of machines for the protection of the operating personnel. In order to assure these, on the basis of a common legal basis an adequate standard of safety is necessary.

The EU - Machine Directive represents a guideline for machine safety and is binding for all machines, which are utilised within the European economic area.

To be viewed as implementing for the Machine Directive are in particular the harmonised European standards. For the field of the „Functional safety " mainly two standards are mentioned: EN ISO 13849-1, applicable as from the end of 2009, and EN 62061, applicable since August 2006. They have been harmonised under the Machine Directive. The standard EN ISO 13849-1 can also be utilised for non-electrical systems and is simpler in its application. It is recommended by the Verband Deutscher Maschinen- und Anlagebau VDMA (Association of German Machine - and Installation Builders).

The machine constructor is required to design and manufacture his installation in accordance with the regulations of the Machine Directive and the standards harmonised with it. He has the sole responsibility for assessing the risks and implementing the measures. The component manufacturer for this purpose provides him with a statement concerning the reliability of the individual element.

The procedure from the assessment up to the definition of the measures is described in the standard Norm EN ISO 13849 and is roughly as follows:

On the basis of the risk analysis and the concluding risk assessment, safety functions have to be identified and measures undertaken for reducing the risks. On the basis of the function analysis and the application conditions of the machine, resp., of the system, in a next step the „Performance Level" (PL) is determined. This is indicated with a value between a (low risk) and e (high risk). By means of a corresponding system architecture and the utilisation of reliable control elements the system can be designed for the required PL.

For the assessment of the reliability of components the value „$MTTF_d$" (mean time to dangerous failure) is utilised. As a statistical value it indicates the time up to a hazardous failure or error.

Wandfluh AG designs all hydraulic components using the fundamental and proven safety principles in accordance with EN ISO 13849-2:2003, table C.1 and C.2. The operating conditions of the components are documented in the data - and information sheets belonging to them. The resulting „$MTTF_d$" of 150 years therefore corresponds to the determination as it is made in accordance with EN ISO 13849-1:2006 annex C.3.

The user of the component has to comply with the fundamental and proven safety principles in accordance with EN ISO 13849-2:2003, table C.1 and C.2, for the implementation and the operation of the hydraulic component.
