Safety of Machinery Training Course (2010)

Acquisition and the Safe Use of Machinery
(PUWER98)

Course Purpose
The objective of this course is to equip users of machinery with the knowledge to use and maintain their machinery reliably and safely in accordance with their obligations under the Provision and Use of Work Equipment Regulations 1998 (PUWER98). Also to assist them in when acquiring equipment by developing awareness of the suppliers obligations in particular the processes involved in CE Marking.

Course Accreditation
This course has been recognized by **TÜV Rheinland** as a "Level 3" program of study and meeting the quality management and quality system elements as defined by EN29004-2 / ISO9004-2.

Course Objectives
Learning objectives of this course:-

- To provide a working knowledge of the European Machinery Directive and the Directives associated with it.
- To understand the "Essential Requirements" of Directives and the manufacturers responsibilities for CE Marking.
- Understand the workings of the PUWER98 in the United Kingdom.
- Familiarity with European Harmonised Standards.
- To recognise work equipment, workplace & work task hazards and associated risks
- To understand the process of risk assessment, risk evaluation and risk reduction.
- To recognise the suitability and adequacy of guarding.
- To become familiar with protective techniques and their integration into machine control systems.
- To recognise the suitability and adequacy safety related parts of control systems.
- To recognise the need for adequate "safe systems of work".
- To verify that machinery meets with the Provision and Use of Work Equipment Regulations 1998.

Who will benefit?
This course is designed for machine users who want to validate machines from equipment suppliers, who need to become aware of the legal requirements defined by the Machinery related European Directives and to develop awareness of the manufacturers & suppliers legal responsibilities in the process of EU CE Marking machine systems.
Note: This training can be delivered in whole or in part to best suit the needs of the attendees.

Prerequisites
There are no prerequisites for this course.

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Course "*Module*" Overview:-

Europe & Directives – (Module 1)

Objective:-
To develop an awareness of the aims of the European Union and their implementation using European Directives.
To introduce the Directives that call for CE Marking and to examine the essential requirements of the "*New*" Machinery Directive and the associated directives that may be applied in the machinery industry.

Key Topics:-

- Single European Market
- European Directives & their adoption into UK Law
- New Approach Directives, Essential Requirements & the CE Mark
- CE Marking Directives
- "*New*" Machinery Directive, its Essential Requirements & the implications of Annex IV
- Changes brought about by the "*New*" Machinery Directive
- Associated Directives:-
  - Low Voltage Directive & its Essential Requirements
  - EMC Directive & its Essential Requirements
  - Pressure Equipment Directive & its Essential Requirements
  - ATEX Directives & their Essential Requirements
  - Use of Work Equipment Directive
  - General Purpose Products Directive

Buying & Using Machinery – the CE Mark & PUWER – (Module 3)

Objective:-
To develop an understanding of the purpose of CE Marking and the implications of importing machinery from outside the EU.
What information manufactures must provide when purchasing machinery and when to expect a CE Mark.
To understand the obligations under the Provision & Use of Work Equipment Regulations (PUWER98) and who is responsible.
Methods of undertaking a PUWER98 "audit" and how PUWER98 is enforced.

Key Topics:-

- Purpose of the CE Mark
- Purchase of machinery from outside the EU
- What the CE Mark indicates
- What is a Declaration of Conformity or Incorporation?
- Who is responsible for what?
- Buying a new machine & protecting investment.
- Purpose of PUWER98?
- The difference between CE Marking & PUWER98
- What is a PUWER Audit and when and how often should it be undertaken?
- Undertaking a PUWER98 Audit
- Practical PUWER – Things to look out for

European Harmonised Standards – (Module 4)

Objective:-
To develop an understanding of standards and indicate the relationship between UK, European and International standards.
To examine the purpose of European Harmonised Standards, their development and relationship with Directives and CE Marking.
To introduce the core "Safety of Machinery" standards and new & revised standards being introduced in support of the "New" Machinery Directive and so called "Functional Safety".

Key Topics:-

- What is a Standard?
- UK, EU & International Standards
- What is a Harmonised Standard?
- Structure of a Harmonised Standard
- Safety of Machinery Standards – A, B & C type standard relationships
- An overview of the Safety of Machinery "core" standards
- "Functional Safety" – the relevance of EN 61508, EN 62061 & EN ISO 13849

Hazards & Risks – (Module 5)

Objective:-
Defining hazards and risks, their relationship and explore types of hazards & risk associated with machinery by typical examples.

Key Topics:-

- What are hazards & risks?
- How are they related?
- Typical hazards
- Hazardous situations
- Hazardous zones
- Need for Risk Assessment

Risks Assessment – (Module 6)

Objective:-
To remove the "mystique" associated with Risk Assessment.
Assessing risks associated with machinery and their application environment and how control over the risks may be applied.
Examination of qualitative and quantitative method of risk assessment and how they are most suitably applied.

Key Topics:-

- What is Risk Assessment?
- Risk Assessment as a problem solving "Tool"
- Types of risk
- Risk Control - Hazard identification, Risk Evaluation & Management
- Methods of Risk Assessment – Qualitative & Quantitative
- What is "suitable & sufficient"?
- Identification of Residual Risks
- Hints & Tips when undertaking a Risk Assessment

Risk Reduction – (Module 7)

Objective:-
To develop an understanding of the methods and processes of risk reduction related to risk assessment.
To examine various hierarchical methods of risk reduction.

Key Topics:-

- Fundamentals & objectives of Risk Reduction
- The "3 step method" of risk reduction
- What is "reasonable practicability"
- Dealing with Residual Risks
- Risk reduction:-
  - by design
  - by guarding
  - by safety controls
  - by information
  - by personal protective equipment
  - by Safe Systems of Work
  - by training, supervision & organisation

Design & Maintenance of Safety Related Control Systems – (Module 8)

Objective:-
To develop a clear understanding of the purpose, requirements and realisation of the safety related parts of control systems.
To understand how to assess the required performance of a safety system in relation to the risks posed by a particular machine and to develop a suitable configuration.
To understand how a complete safety system should encompass the electrical, pneumatic, hydraulic and mechanical parts of the control system.
To understand the need for quantified verification and validation of safety related control systems and the changes taking place in connection with so called "Functional Safety" (as implemented by EN 61508, EN 62061 & EN ISO 13849-1).
To be able to control and manage the application and coordination of safety related control systems for machines in the formation of integrated manufacturing systems.

Key Topics:-

- The safety systems concept
- Resistance to Faults - Redundancy & Diagnostics
- Configuration of a safe related control system
- The "Safety Relay" – a magic box?
- Understanding "new" terminology & acronyms such as SRP/CS, SIL, PL, DC, etc.
- Coordinated integration of safety related control systems
- Application of electronic & programmable logic in safety related systems
- Implications of the replacement of EN 954-1 by EN ISO 13849-1
- What is "Black Box" technology & the application of EN ISO 13849
- Selection & application of safeguards & protective devices
- Estimating the systems required performance
- Quantified verification of complete safety related control systems
- Estimating actual performance against required performance of the system
- Verification & Validation of Safety Related Control Systems

Protective Devices & Techniques – (Module 9)

Objective:-
An overview of protective devices available and techniques in their application

Key Topics:-

- Interlock Switches (contact & non-contact)
- Guard Locking devices
- Types of Light Curtains & similar devices
- Application of Light Curtains & similar devices
- Safety Mats and Edges
- Imaging Systems
- Two Hand and Hold-to-Run controls
- Motor Speed Controllers
- Emergency Stops

Supplementary – Surgery

Objective:-
An opportunity for the attendees to introduce their "real" problems, machines and equipment, discuss and to apply and implement the knowledge gained under guidance of the presenter.

Note: the supplementary units are subject to the needs of the attendees and the venue. Surgery may require attendees wishing to bring drawings, documentation, photos, etc, and for on-site training, access to the equipment would be an advantage. Preparation is essential.

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