

**UNECE Working Party on  
Regulatory Cooperation and Standardization Policies (WP.6)  
Sectoral Initiative on Earth-Moving Machinery Safety**

**COMMON REGULATORY OBJECTIVES (CRO)  
REVISED PROPOSAL**

**I. INTRODUCTION**

1. The earth-moving machine industry has been a global industry for many years and ISO standards have been developed for the safety risks to promote global technical requirements. The ISO/TC 127 safety standards for Earth-Moving Machines can be used as the technical requirements for an UNECE “International Model for Technical Harmonization” (UNECE WP 6 Recommendation “L”) aimed at harmonizing technical regulations based upon international standards.
2. ISO/TC 127 was formed in 1968 with an objective to develop a complete set of standards to address the safety and commercial needs for Earth-Moving Machines. Over 100 standards for earth-moving machines have been published and new standards are continually being developed to address new technology and new types of Earth-Moving Machines.
3. Many national and regional regulations already use the technical requirements contained in the ISO/TC 127 standards to address the safety risks for Earth-Moving Machines. A good example is in the EU, where the EN 474 standard was developed to enable manufacturers to show that Earth-Moving Machines comply with the EU Machine Safety Directive (2006/42/EC). EN 474 addresses all significant risks for earth-moving machines and the technical requirements to minimize the risks are coming from 40 of the ISO/TC 127 standards.
4. During the Construction Equipment Joint Technical Liaison (JTLM) meeting in 2003 between the industry associations from Europe (CECE), the USA (AEM) and Japan (CEMA), it was decided to elaborate a CRO (“Common Regulatory Objective”, as proposed by the mechanism of the UNECE “International Model”) for Earth-Moving Machines within UNECE WP 6. It was also decided to establish a Working group to develop the proposal for the CRO on Earth-Moving Machines based on the ISO/TC 127 standards and an ISO version of EN 474, ISO 20474. The following were nominated as members of the JTLM working group:
  - i. Jan Mimer, Volvo, representing CECE and the EU
  - ii. Dan Roley, Caterpillar, representing AEM and the USA
  - iii. Kenzo Tanaka, Komatsu, representing CEMA and Japan

5. A CRO for Earth-Moving Machines is proposed, incorporating the principal elements defined in the UNECE Recommendations on Regulatory Cooperation and Standardization Policies, Recommendation L “International Model for Technical Harmonization” (in particular in Annex B) and the new ISO/TC 127 general safety standard ( ISO 20474). The proposed CRO covers safety for Earth-Moving Machines, but does not cover environmental noise, engine emissions and roading requirements, that are covered under general regulations that apply to many types of mobile machines.
6. In 2008 a need was recognized to improve the compliance clause to address the requirement for third party certification in developing countries where a trust of manufacturers for SDoC has not been achieved yet. The EMM CRO is being updated in 2009 to improve the compliance clause.

## **II. SCOPE STATEMENT**

7. This CRO applies to the design and construction of Earth-Moving Machines (machines as described in ISO 6165) and establishes essential Health and Safety requirements concerning the prevention of hazards to which workers can be exposed at work. This CRO specifies the general safety requirements for Earth-Moving Machines and deals with all significant hazards pertinent to Earth-Moving Machines, when used as intended and under the conditions foreseen by the manufacturer. This CRO specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards and hazardous situations for Earth-Moving Machines.

## **III. MACHINE REQUIREMENTS**

8. Earth- Moving Machines must be constructed so that they can be used, adjusted, and maintained without putting persons at risk when these operations are carried out under the conditions foreseen by the manufacturer. Measures must be taken to minimize any risk of accident throughout the foreseeable lifetime of the machines, including the phases of assembly and dismantling.
9. The specific requirements to address all of the safety risks for Earth-Moving Machinery are covered in a single ISO/TC 127 general safety standard, ISO 20474:2008 Earth-Moving Machinery – Safety – General Requirements. ISO 20474 references over 40 other ISO standards for Earth-Moving Machines and provides general performance requirements to address the safety risks.
10. Machines that comply with the ISO 20474 standard for Earth-Moving Machines are presumed to comply with all of the safety requirements for Earth-Moving Machines. ISO 20474 defines performance criteria that lead to safe levels for the risks. Other solutions that provide equal to or better safety levels are acceptable, to allow for new technology or alternate options for addressing the safety risks.

#### **IV. COMPLIANCE CLAUSE**

11. Compliance with this CRO shall be by Suppliers Declaration of Conformity (SDoC), as it is currently being done in the USA, the EU and Japan. In some countries where manufacturers are not prepared to do SDoC or are not trusted yet to do SDoC, the assistance of a third party may be necessary for conformity assessment. For these countries, the manufacturer can work with a Third-Party for Conformity Assessment. Conformity assessment testing that has already been done by the manufacturer can be used if the manufacturer has the following:

- a. A quality plan that is at least equivalent to ISO 9000
- b. A documented conformity assessment process
- c. A conformity assessment group to manage the conformity assessment
- d. Access to conformity assessment facilities (internal or external)

#### **V. MARKET SURVEILLANCE AND PROTECTION CLAUSE**

2. Countries having agreed to the CRO are responsible for market surveillance within their territory. If a country finds machines claiming conformity with a CRO that do not actually conform to the requirements, the country may withdraw such a machine from its market.

## Annex A

### Safety Process for Earth-Moving Machines

1. The common goal for earth-moving machine (EMM) users, health and safety groups, and machine manufacturers is zero injuries for machine operators and the people on work sites. To achieve this goal, EMM must be developed so that they can be used safely and the work site must have a safety plan for machines and people to work together safely. The safety process for EMM to achieve the safety goal of zero injuries is summarized below:



2. The safety process starts by defining the safety risks and developing safety standards that define acceptable safety performance levels to address the risks. This is done in ISO/TC 127 with the cooperation of machine users, health and safety organizations, and machine manufacturers.

#### 1. ISO/TC 127 Standards Adoption Process

##### General ISO/TC 127 Objectives and Process:

3. ISO/TC 127 develops international standards to meet the need for global standards for earth-moving machines. The objectives and process for ISO/TC 127 are to:

(a) Create and maintain a complete set of International standards to address all safety risks and commercial needs for earth-moving machines to promote global harmonization of machine requirements;

(b) Define acceptable safety performance requirements for all safety risks to meet the needs and expectations of customers, health and safety organizations, and regulators;

- (c) Promote the use of the ISO/TC 127 standards as national standards and as the technical requirements for national regulations;
- (d) Provide training and assistance for:
  - understanding the ISO standards process
  - participating in the development of ISO/TC 127 standards
  - adopting the ISO standards as national standards
  - using the technical requirements in the ISO/TC 127 standards for national regulations.

### **Process for Developing Countries**

4. About 10 years ago ISO/TC 127 recognized that the ISO/TC 127 standards define safety levels that exceed the current technical capability and cultural demands for safety for developing countries. A process was initiated to encourage participation in ISO/TC 127 by developing countries and to enable developing countries to more effectively use the ISO/TC 127 standards.

5. To facilitate the adoption and use of the ISO/TC 127 standards by developing countries, ISO/TC 127 implemented the following:

(a) An ISO 20474 General Machine Safety Standard that references all of the ISO/TC 127 safety standards in a single standard;

(b) A general guidance document for adopting ISO 20474 as the national safety standard for earth-moving machines. This document recommends that developing countries:

- adopt ISO 20474 as the national safety standard
- during the adoption process, evaluate the need for all of the requirements in ISO 20474, consistent with current technology levels and cultural expectations
- identify some of the requirements in the national standard as voluntary or optional for the short term to accommodate technology level and safety expectations.

(c) Training seminars for developing countries to provide guidance for national adoption of the ISO 20474 standard, with information to help identify requirements that should be evaluated and potentially adopted as voluntary or optional national requirements for the short term.

6. This approach benefits national manufacturers who want to market machines internationally by defining the global requirements for selling machines. It also allows the nationally adopted ISO 20474 safety standard to recognize current levels of technology, customer expectations, and social customs by allowing some of the global requirements to be voluntary or not applicable.

7. The intent is that all countries can use this general safety standard as the basis for national standards and also use the content of this safety standard as the technical requirements for national regulations to promote global harmonization of regulations for earth-moving machines.

## **2. Conformity Assessment and Certification for EMM**

8. The best practice is to allow manufacturers to do their own conformity assessment testing and declaration of conformity certification, defined as supplier's declaration of

conformity (SDoC) in ISO 17050-1. ISO/TC 127 standards define test methods and performance criteria that manufacturers can use for conformity assessment testing and certification. EMM manufacturers verify compliance with standards and regulations during the machine development process and can certify machine compliance using SDoC.

#### **Machine Conformity Assessment Challenge**

9. Some countries require third party certification because manufacturers:
  - do not have expertise to do SDoC
  - do not have test facilities for SDoC
  - are not trusted to do SDoC.
10. Third party conformity assessment and certification is appropriate for these countries. The long term goal is SDoC, but third party conformity assessment and certification may be necessary for the short term for developing countries. To minimize the cost and time required for third party certification, testing done by manufacturers should be accepted by the third party, if it is properly done.

#### **Conformity Assessment Testing**

11. Conformity assessment testing already completed by the manufacturer should be accepted for third party certification, if the manufacturer has the following:
  - a quality plan that is at least equivalent to ISO 9000
  - a documented conformity assessment process
  - a conformity assessment group to manage the conformity assessment
  - access to conformity assessment facilities (manufacturer's facility or independent test labs)
  - documentation of test results.

#### **Certification of EMM**

12. Manufacturers are asked to certify many areas for EMM:
  - standards compliance
  - regulations compliance
  - quality process
  - country of origin
  - date of manufacturer
  - compliance with specifications
  - sustainability Information.
13. A simple generic certificate could simplify the certification process for manufacturers and help machine users and customs people recognize official certificates – see the example global certificate on the last page.

### **3. Work Site Risk Management and Surveillance for EMM**

14. Manufacturers of Earth-Moving Machines perform risk analysis to address all safety risks. To complete the risk management, users of machines should also do a risk analysis

for the additional risks on the work site. The information below provides guidance for the work site risk management process and for preparing the appropriate work site organization (rules and procedures for the jobsite that coordinate machines and people safely working together) to address the risks.

#### **Machine Risk Analysis**

15. The ISO/TC 127 Safety Standards define acceptable safety performance levels for all safety risks for earth-moving machines. These performance levels are summarized in ISO 20474. This standard also defines the information that should be included in the machine operations manual to define machine intended use and guidance to the operator for safe machine operations. The machine operations manual can be used as the summary of the risk evaluation for earth-moving machines.

#### **Work Site Risk Analysis**

16. The specific risks on the work site also need to be evaluated to address additional risks for machines and people on the work site. These risks include:

- risks for Machines and the Operator: Underground (gas lines, electrical cables), Overhead (Structures, electrical lines), Terrain Conditions (steep, slippery, soft), Other Machines or Vehicles on the Work Site
- risks for Other People: Other Workers, General Public, Children on the work site.

#### **Work Site Organization**

17. Each work site should have rules and procedures that will allow machines to work safely with other machines and with other workers or people on the work site. These should cover the routine procedures as well as the specific rules and procedures to address the work site risks, such as:

- operator and worker training
- machine maintenance
- appropriate size and type of machines
- communication process between workers
- traffic patterns and restricted areas.

#### **Work Site Surveillance**

18. The work site organization plan should include provisions to verify that the plan is being implemented properly. Machines need to be maintained, workers need to be trained and need to follow the work site rules and procedures. The work site safety or project leaders should continually assess and take responsibility for work site surveillance. Some governmental agencies may also have responsibility to perform work place surveillance to assist machine users.

## **4. Summary**

19. Achieving the goal of zero injuries requires the cooperation of machine users, manufacturers, and health and safety experts to:

- define reasonable and realistic safety performance levels to address safety risks (done by all groups)

- develop machines that comply with the safety performance levels (responsibility of manufacturers)
  - develop and follow the appropriate work site organization plans to address risks and allow machines and people to work together safely (responsibility of machine users).
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