

ICS 53.100

CCS P 97



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 32070-2022

Replacing GB/T 32070-2015

**Earth-moving machinery - Object detection systems and
visibility aids - Performance requirements and tests**

Issued on: October 12, 2022

Implemented on: October 12, 2022

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	1
2 Normative references	1
3 Terms and Definitions	2
4 Performance requirements and tests	3
4.1 General requirements	3
4.2 Position and fixation of ODS and its VA	3
4.3 Driver position component	4
4.4 System activation and initialization check	6
4.5 ODS monitoring time	6
4.6 Continuous self-test	6
4.7 Failure of ODS alarm device	7
4.8 Electromagnetic Compatibility and Physical Environment Operating Conditions	7

foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules for Standardization Documents" drafting.

This document replaces GB/T 32070-2015 "Earthmoving machinery hazard monitoring system and its visual aids performance requirements and test

Test". Compared with GB/T 32070-2015, except for structural adjustment and editorial changes, the main technical changes in this document are as follows.

- Changed the scope (see Chapter 1, Chapter 1 of the.2015 edition);
- Added and modified terms and definitions (see Chapter 3, Chapter 3 of the.2015 edition);
- Changed the general performance requirements (see 4.1, 4.1 of the.2015 edition);
- Changed the driver's position component requirements (see 4.3, 4.3 of the.2015 edition);
- Deleted the general requirements for operational integrity (see 4.6 of the.2015 edition);
- Changed the requirements for the failure of the system alarm device (see 4.7, 4.7 of

the.2015 edition);

--- Increased electromagnetic compatibility requirements for ODSs and their VAs (see 4.8);

--- Increased other information files of the driver's manual (see 6.2);

--- Changed the test procedure of the radar sensor (see Appendix C, Appendix C of the.2015 edition);

--- Changed the test procedure of the ultrasonic emission system (see Appendix E, Appendix E of the.2015 edition);

--- Increased normative appendix (see Appendix G ~ Appendix I).

This document is equivalent to ISO 16001.2017 "Earthmoving machinery object monitoring system and its visual aids performance requirements and test

Test".

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

This document describes the test procedures and guidelines for object detection systems (ODSs) and their visual aids (VAs), which prompt the

The machine has objects in the monitoring area.

Appropriate on-site management, driver training and the adoption of relevant vision standards (GB/T 16937 and GB/T 25685) assist in solving the problem of on-site personnel problems.

staff safety issues. In some cases, the driver cannot obtain the field of view of the work area through direct vision or indirectly through the use of surveillance mirrors. In this kind of

In some cases, the driver's vision can be improved by using ODSs and their VAs.

ODSs and their VAs provide the driver with information on whether a person or object is in the path of the machine's movement (mainly when reversing).

Both ODSs and their VAs have advantages and disadvantages. System users need to recognize and understand the shortcomings of ODSs and their VAs. Appendix A summarizes the

Advantages and disadvantages of the selected device.

It is important to note that ODSs and their VAs have both advantages and disadvantages. No device can perform perfectly in all situations. system user

It is very important to identify and understand the drawbacks of ODSs and their VAs, and

Appendix A lists the advantages and disadvantages of the selected devices.

Haptic signals are currently being used in the automotive industry, so the use of tactile signals in ODS warning devices was discussed during the revision of this document.

Sensory signals (signals that stimulate the driver to touch, including vibration, force, and movement) replace visual and auditory signals. While this document currently does not allow

An alarm device that uses tactile signals, but may be incorporated into the alarm device as a supplement to visual and audible signals. Apply touch on earth moving machinery

The validity of sensory signals needs more research to be sure.

Earth-moving Machinery Object Monitoring System and Its Visualization

Auxiliary device performance requirements and tests

1 Scope

This document specifies general requirements for the performance of object detection systems (ODSs) and their visual aids (VAs) used on earth-moving machinery

and description methods for evaluation and testing, including the following.

- Surveillance and/or visualization of objects including personnel in the surveillance area;
- Visual and/or audible alarms for test personnel and personnel in the monitoring area (if applicable);
- Reliability of system operation;
- System compatibility and environment description.

This document applies to earth-moving machinery as defined in ISO 6165. ODS and/or VA can be used to increase the driver's direct field of view (see

ISO 5006) or indirect vision when using a surveillance mirror (see ISO 14401). Additionally, ODS and/or VA can be used for object monitoring or

Field of view provides additional methods, for example. consideration of ergonomic limitations on direct field of view effects, avoiding repeated rotation of the head and upper body.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references

For documents, only the version corresponding to the date is applicable to this document;

for undated reference documents, the latest version (including all amendments) is applicable to

this document.

ISO 3411 Earth-moving machinery driver's body size and driver's minimum activity space (Earth-moving machinery-

Note. GB/T 8420-2011 Earth-moving machinery driver's body size and driver's minimum activity space (ISO 3411.2007, IDT)

ISO 6394 Determination of emission sound pressure level at driver's position of earth-moving machinery Set test conditions (Earth-moving machinery-

Note. GB/T 25613-2010 Determination of emission sound pressure level at driver's position of earth-moving machinery Set test conditions (ISO 6394.2008, IDT)

ISO 9533 Test methods and performance criteria for audible alarm devices and front horns for earth-moving machinery (Earth-moving machinery- criteria)

Note. GB/T 21155-2015 Earth-moving machinery driving sound alarm device and front horn test method and performance criteria (ISO 9533.2010, IDT)

ISO 13766 (all parts) Electromagnetic compatibility (EMC) of earth-moving machinery and building construction machinery with built-in power supply [Earth-

Note. GB/T 22359 (all parts) Electromagnetic compatibility (EMC) of earth-moving machinery and building construction machinery with built-in power supply [ISO 13766 (all parts)

points), IDT]

ISO 15998 Performance criteria and tests for the functional safety of machine control systems (MCS) for earth-moving machinery applications electronics

Note. GB/T 34353-2017 Performance criteria and tests for machine control system (MCS) functional safety of electronic devices for earth-moving machinery applications (ISO 15998.2008, IDT)