ICS 53.100
CCS P 97

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 45866-2025

Earth-moving machinery - Layered software architecture for machine control system - General requirements

土方机械 机器控制系统分层式软件架构 通用要求

Issued on: August 1, 2025 **Implemented on: February 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

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.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee for Standardization of Earthmoving Machinery (SAC/TC334).

This document was drafted by: Jiangsu Xugong Guozhong Laboratory Technology Co., Ltd., Guangxi Liugong Machinery Co., Ltd., Shanxi Taizhong Intelligent Mining Equipment Technology Co., Ltd., Shanghai Jiao Tong University, Fujian Weisheng Machinery Development Co., Ltd., Tianjin Engineering Machinery Research Institute Co., Ltd., Lingong Heavy Machinery Co., Ltd., Shandong Kenshi Heavy Industry Machinery Co., Ltd., SINOMACH Changlin Co., Ltd., Fujian Jingong New Energy Technology Co., Ltd.

Technology Co., Ltd., Zhuzhou National Engineering Research Center for Converter Technology Co., Ltd., and Beigu Electronics Co., Ltd.

The main drafters of this document are: Qin Haoliang, Wang Jilin, Yue Haifeng, Wang Yafei, Xiao Zineng, Wu Hongli, Gao Zhenhua, He Guangmin, Yan Jieyin, Xiao Yubo, Liu Huirong,

Deng Bo, Song Tianjia, Li Zexing, and Chen Baoqing.

Layered software architecture for earthmoving machinery control systems General requirements

1 Scope

This document specifies the functional requirements of the hierarchical software architecture for earthmoving machinery control systems, establishes the structural components of the software architecture, and describes This paper describes the functional modules of the application layer, mapping layer and basic layer components and the design process of the software architecture.

This document applies to the development and design of a layered software architecture for machine control systems of earth-moving machinery.

2 Normative references

GB/T 8498

GB/T 28174.2

3 Terms and Definitions

The terms and definitions defined in GB/T 8498 and the following apply to this document.

3.1 machine control system machine control system

The components of the system need to meet the system's functions, including sensors, signal processing units, monitors, controls and drives, or any of them. Several parts.

NOTE. The scope of the system is not limited to electronic control but is defined by the functions associated with the complete system equipment. Therefore, it generally includes electronic, non-electronic and Connecting equipment. This includes mechanical, hydraulic, fiber optic or pneumatic components/systems.

3.2 module

a) Discrete unit of program.

b) One or more logically separate parts of a program that have independent functions.

[Source. GB/T 11457-2006, 2.977, modified]

3.3 software architecture

The basic organizational structure of a system with modules, the relationship between

modules, and the relationship between modules and the environment as its content, as well as the guiding principles Describe the principles of content design and evolution.

3.4

The software architecture is grouped in order according to its functions, and logically divided into multiple sets (layers) that follow certain rules.

Note. By layering, the dependencies between different functional modules of the software architecture are limited, making them more loosely coupled and easier to maintain.