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Industrial automation systems and integration — Standardized procedures for production systems engineering —

Part 3: Information flows in production planning processes

Systèmes d'automatisation industrielle et intégration — Procédures normalisées pour l'ingénierie des systèmes de production —

Partie 3: Flux d'informations dans les processus de planification de la production

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration,* Subcommittee SC 4, *Industrial data*.

A list of all parts in the ISO 18828 series can be found on the ISO website.

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Introduction

Increasing cost pressures in a competitive global environment, coupled with constantly growing levels of product and process complexity, means that advanced production planning skills are now a key factor of success for many manufacturing companies. To produce competitively, it is necessary not only to ensure the efficient operation of the production structures, but also to be in a position to plan and design these to respond to specific requirements and at a high level of quality. Constantly shortening planning and development times and, thus, reducing time-to-market is a crucial component of economic success in today's markets. In parallel with product design, and prior to the initial start of production (SOP), production planning is a business process that has great potential with respect to improving product and process planning. Researching, generating, processing, and transferring information are important aspects of production planning. Depending on the level of maturity of the planning and the respective planning discipline (see Clause 4), definable information packages emerge, which are generated iteratively during planning, and processed further through the overall planning process. The resulting information flows are followed via a reference planning process. This helps to specify the state of information at defined points during planning. The comparison of actual states against target states of information packages is performed at these defined points (see Annex A).

NOTE See Bibliography for further detail on research background.

The main information flows in production planning are specified in this document. They are examined in the context of the reference planning process (see Figure 1) described in ISO 18828-2. Also building on the reference planning process and on the information flows, this document describes key indicators for the transparency and assessment of the planning processes.

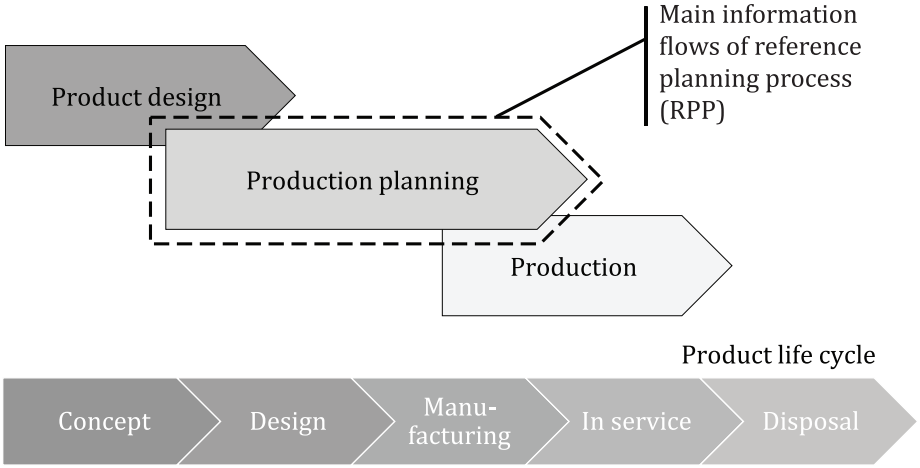


Figure 1 — Main information flows of the reference planning process (qualitative depiction)

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Industrial automation systems and integration — Standardized procedures for production systems engineering —

Part 3: Information flows in production planning processes

1 Scope

This document describes the information flows identified for each planning discipline within production planning, according to ISO 18828-2.

The following aspects are within the scope of this document:

— general overview of the main information flows within the reference planning process;

— basic pattern to describe the main information flows;

— detailed description of every main information flow;

— state notation structure of the main information flows objects;

— detailed descriptions for each information object state;

— proposal of checklists for benchmarking information objects.

The following items are outside the scope of this document:

— information flows to intersecting areas, including high-level planning;

— data models for production planning;

— complete description of all possible information flows/objects within production planning;

— workflow engines for automated production planning;

— production facilities planning/manufacturing facilities planning (physical plant and equipment); including any kind of resource that is not directly related to the manufacturing process;

— value chain (inbound logistics, operations management, outbound logistics, marketing and sales);

— process simulation/safeguarding;

— investment planning during production process management.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15531-1, *Industrial automation systems and integration — Industrial manufacturing management data — Part 1: General overview*

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ISO 18828-2, *Industrial automation systems and integration — Standardized procedures for production systems engineering — Part 2: Reference process for seamless production planning*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15531-1, ISO 18828-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
intralogistics
internal logistics
delivery methods and means of transport at the production site and detailed description of the container concept

Note 1 to entry: The delivery methods include buffers and supermarkets (having defined and simulated ranges), transport capacity, and delivery cycles. They are supported by electronic tools such as product data management (PDM) or enterprise resource planning (ERP) systems that map all required resources and the infrastructure. The detailed container concept includes a complete description of all containers used, the container types, the container size, their sequences, and the partition and packaging concepts for parts and assemblies.

3.1.2
investment planning
detailed calculation of all costs during production planning that determine the investments and overhead for a planning alternative of a production system

Note 1 to entry: This calculation is carried out bottom-up for all processes and resources (with respect to concrete machines, facilities, etc.). It is supported by calculation templates, additional calculation tools, and digital planning tools featuring extended planning functions.

3.1.3
layout planning
information needed for planning and implementing a production layout, including the arrangement and sizing of lines, stations, machines, circulation areas, and road network

Note 1 to entry: An additional component of layout planning is the cost calculation for structural measures and utilities installations for planned facilities.

3.1.4
operation list
list of information including flow charts and personnel allocations, required concrete resources (manufacturing, assembly or personnel resources), infrastructure for production and associated required manipulators (operating resources such as cranes and steel constructions)

Note 1 to entry: This list of information is normally stored in digital tools, e.g. ERP systems.

3.1.5
precedence graph
graph that displays all required manufacturing and assembly operations and the associated process times and work content for a work system in the correct sequence

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3.1.6
product
thing or substance produced by a natural or artificial process

[SOURCE: ISO 10303-1:1994, 3.2.26]

3.2 Abbreviated terms

BPMN	business process model and notation
CAD	computer-aided design
ERP	enterprise resource planning
PDM	product data management
UML	unified modelling language

4 Classification of information flows in the reference process

When describing the information flows in production planning, it is sensible to restrict it to the most important planning disciplines found in manufacturing companies. The structure of the reference model for seamless production planning is given in ISO 18828-2. The following production planning disciplines are used to identify the main information flows (see Figure 2): manufacturing, assembly, logistics and layout.

NOTE For further details and decomposition of planning discipline and relations, see ISO 18828-2.

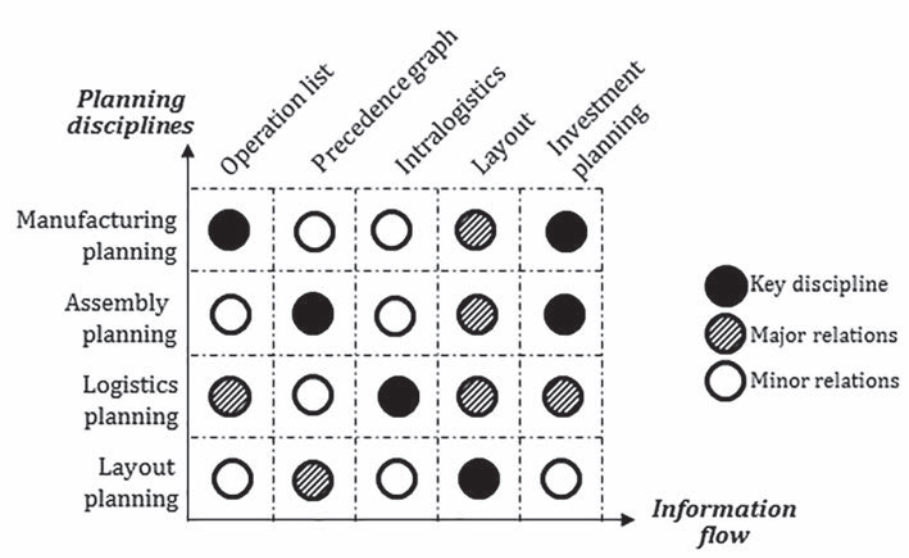


Figure 2 — Main information flows structured by planning discipline

The information flows described in Clause 5 originate from the reference planning process. They represent an information-oriented view of the overall planning process and take into account both the planning disciplines and planning phases. This document provides additional information that focuses on the transparency of the information flows. The process interfaces include the process phases (i.e. conceptual, rough, and detailed planning) in one dimension, and the planning disciplines of manufacturing, assembly, logistics, and layout, in the other.

In addition, the information flows per se can be regarded as individual, isolated information flows.

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