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A Database Design for the Machine Shop Information Model

Y. Tina Lee
Yan Luo

*Manufacturing Systems Integration Division
Manufacturing Engineering Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899-8260*

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Y. Tina Lee

Yan Luo

Manufacturing Systems Integration Division
National Institute of Standards and Technology
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Abstract: This report describes a database model currently under development at the Manufacturing System Integration Division (MSID) of the National Institute of Standards and Technology (NIST). The database model contains a set of tables that are mapped onto the machine shop information model developed by MSID. The information model provides neutral data interfaces for integrating machine shop software applications with simulation. The interface data include organizations, calendars, work, resources, schedules, parts, process plans, and layout within a machine shop environment. The database model is implemented using Microsoft Access; it is used to support the integration of manufacturing applications and simulations for machine shops. The database's structures, relationships, and usages are presented in this report.

Keywords: database, data structures, information model, machine shop operations, simulation

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1. INTRODUCTION

Standard interfaces could help reduce the costs associated with simulation model construction and data exchange between simulation and other software applications -- and thus make simulation technology more affordable and accessible to a wide range of potential industrial users. Currently, small machine shops do not typically use simulation technology because of various difficulties and obstacles associated with model development and data translation. Small shops typically do not have staff with the appropriate technical qualifications required to develop custom simulations of their operations or custom translators to import their data from other software applications.

NIST is working with a number of industrial partners and researchers to develop neutral formats for machine shop data to facilitate simulation and modeling activities. A machine shop data model, as a neutral interface format, has been under development to support both NIST's System Integration of Manufacturing Application (SIMA) program and the Software Engineering Institute's (SEI) Technology Insertion Demonstration and Evaluation (TIDE) Program. SIMA supports NIST projects in applying information technologies and standards-based approaches to manufacturing software integration problems [1]. The TIDE Program is sponsored by the Department of Defense and SEI and it is currently engaged in a number of other projects with various small manufacturers in the Pittsburgh, Pennsylvania area. The technical work is being carried out as a collaboration between NIST, SEI, Carnegie Mellon University, Duquesne University, the iTAC Corporation, and the Kurt J. Lesker Company (KJLC).

KJLC is an international manufacturer and distributor of vacuum products and systems to the research and industrial vacuum markets. KJLC manufactures complete, automatically controlled vacuum systems with a special emphasis on custom-designed, thin-film deposition systems for research in alloys, semiconductors, superconductors, optical and opto-electronics. A small machine shop is contained within the KJLC manufacturing facility. KJLC's machine shop operation has been used to help define the requirements for simulation modeling and data interface specification activities described in this paper. Their facility will also be used as a pilot site for testing and evaluation of the simulation models, neutral data interfaces, and other software developed under this TIDE project. For more information on KJLC, see www.lesker.com.

The machine shop information model was developed with two goals in mind: a) support for the integration of software applications at a pilot facility -- the KJLC's machine shop, and b) promotion as a standard data interface for manufacturing simulators and possibly for other software applications. The information model is continuing to evolve based on experience and feedback from KJLC's implementations and others involved in this effort. The objective of the information modeling effort is to develop a standardized, computer-interpretable representation that allows for exchange of information in a machine shop environment. The information model, when completed, must satisfy the following needs: to support data requirements for the entire manufacturing life cycle, to enable data exchange between simulation and other manufacturing software for machine shops, to provide for the construction of machine shop simulators, and to support testing and

evaluation of machine shops' manufacturing software. Data structures contained within the information model include organizations, calendars, resources, parts, process plans, schedules, and work orders for machine shops.

An information model is a representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse. The advantage of using an information model is that it can provide shareable, stable, and organized structure of information requirements for the domain context. An information model serves as a medium for transferring data among computer systems that have some degree of compliance with this information model. For proprietary data, implementation-specific arrangements can be made when transferring those data [2].

In general, the contents of an information model include a scope, a set of information requirements, and a specification. Information requirements serve as the foundation of the specification of the information model. A thorough requirements analysis is a necessity. The initial goal for the machine shop information model is to support data transfer needed for KJLC's machine shop operations. This information model, ultimately, will be presented as a candidate for a standard data interface to be used by other machine shops. Thus, the completeness and correctness of the information requirements and a consensus on the data requirements from the industry are also important requisites.

The specification of the information model defines elements, attributes, constraints, and relationships between elements in the domain context. The specification should be laid out using some formal information modeling languages. An information modeling language provides a formal syntax that allows users to unambiguously capture data semantics and constraints. Three types of methods that implement information models and currently used by the manufacturing community are:

- Data transfer via a working form, which is a structured, in-memory representation of data. The method uses a mechanism that accesses and changes data sequentially without actually moving the data around. All shared data are stored in memory.
- Data transfer via an exchange file, which is a file with a predefined structure or format. This method requires a neutral file format for storing the data. The application systems read from and write into files.
- Data transfer using a database management system. This method uses a database management system where information is mapped onto and retrieved from databases.

These implementation methods can be accomplished through translators that are developed using programming languages and database management systems. The selection of an implementation method is heavily dependent on the target environment where the application system resides. While the relational database is generally desirable for data transfer, the traditional file-oriented systems are being used still by many manufacturing applications.

A machine shop database implementation, which generates relational database tables from the information model using Microsoft Access [3], has been developed at the

Manufacturing System Integration Division (MSID) of NIST. The database model will be used to support the integration of manufacturing application and simulation in the shop environment. This report provides a detailed description of the database model. Section 2 presents the concept of standard interfaces that support machine shop simulations. Section 3 overviews the information model of machine shop data. Section 4 describes the objectives of the database development. Section 5 introduces the database model. Section 6 presents sample queries. Section 7 provides conclusions and a discussion on future work. The database model itself is presented in Appendices A-C, and a few sample data tables are presented in Appendix D.

2. STANDARD INTERFACES

This section describes our approach to developing standard data interfaces that support the machine shop manufacturing simulation. We have proposed an architecture for a generic data-driven machine shop simulator [4], and have been constructing a prototype simulator based on the architecture using commercial off-the-shelf software. The architecture for the generic machine shop simulator is divided into the following component elements: a neutral shop data file, an Extensible Markup Language (XML) [5] data processor, a system supervisor and reporting module, a machine shop emulator, a discrete event simulator, and a user interface system. The machine shop information model is a key factor in effectively and efficiently integrating the generic machine shop simulator.

The information model is now being formulated into a schema using the XML schema language [6]. The information model/XML schema serves as a neutral data format for representing and exchanging machine shop data. With the neutral data format, XML parsers, DBMS translators, and/or XML translators, machine shop data can be represented in working forms (structured, in-memory representations), in database tables, or in XML instance documents. Figure 1 depicts the role of the standard interfaces. The XML parsers, “to/from Database Management System (DBMS) translators,” and “to/from XML translators” are custom-built software programs. XML parsers convert XML schemas’ data elements to structural in-memory presentations, such as C++ data structures. “To/from DBMS translators” and “to/from XML translators” allow data to be converted among a user’s data formats, database structures, and XML document formats.

To facilitate an implementation of the machine shop information model, two translators are being developed at NIST. One converts an XML instance document to an Access database; the other converts a database back to XML. XML data structures, which are parsed from the XML Schemas, are used as intermediate representation. A graphical user interface (GUI) system will also be generated to execute various functions, such as import, export, and translator execution.

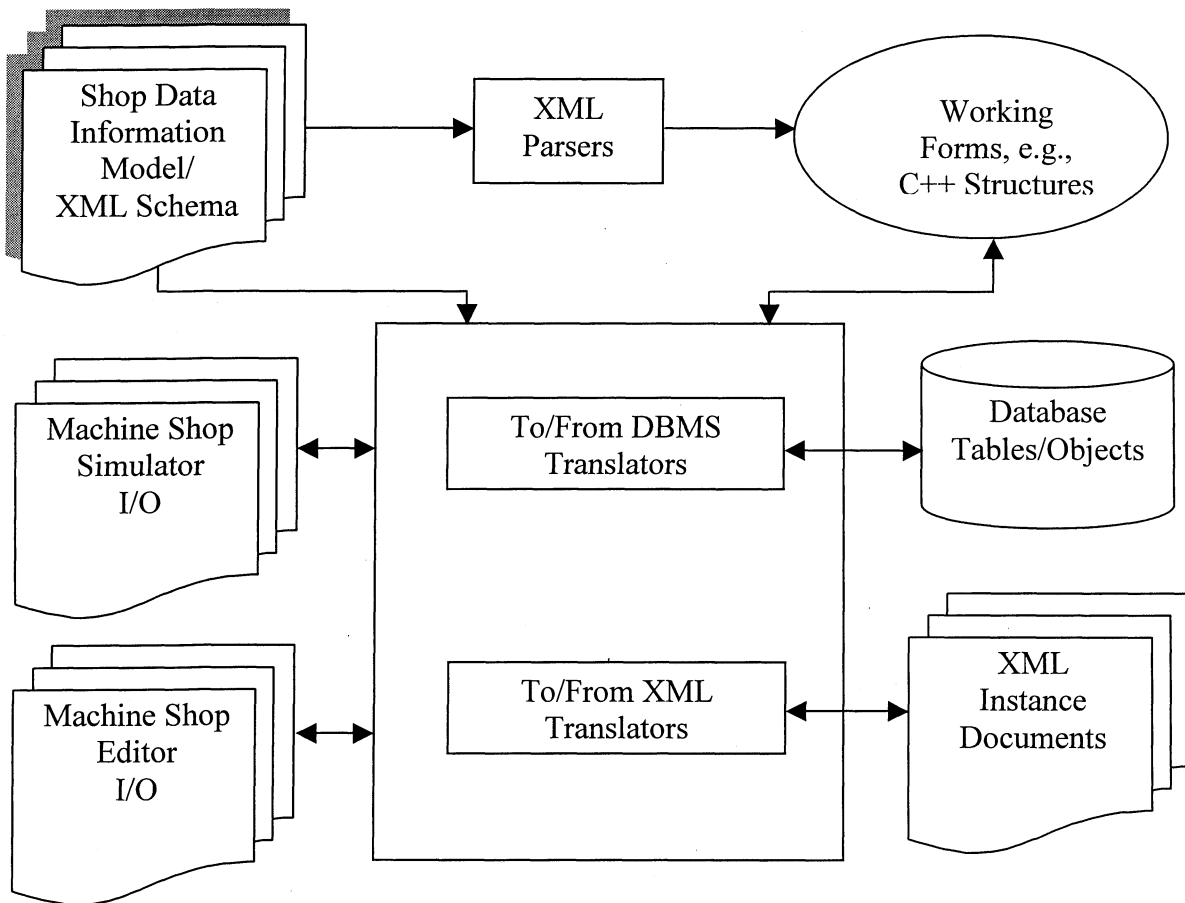


Figure 1: Standard data interfaces

3. OVERVIEW OF THE INFORMATION MODEL

NIST's machine shop data model [7] is presented in both a graphical form in the Unified Modeling Language (UML) [8], and a textual form in XML. The model contains twenty major manufacturing data elements. The primary objective is to develop a structure for exchanging shop data between various manufacturing software applications, including simulation. The idea is to use the same data structures for managing actual production operations and for simulating the machine shop. The rationale is that if one structure can serve both purposes, the need for translation and abstraction of the real data would be minimized when simulations are constructed. The mapping of real world data into simulation abstractions is not, for the most part, addressed in the current data model. Figure 2 illustrates the machine shop data model's top-level data structure that includes most of the major manufacturing data elements identified in the model. The name along with a brief description of each major element is described as follows.

- *Organizations* is used to maintain the organizational structure, contacts and address information for the manufacturing organization and its customers and suppliers.
- *Calendars* identifies the shift schedules that are in effect for a period of time, breaks and holidays.
- *Resources* describes all the resources that may be assigned to tasks in the shop. The resource types available in the machine shop environment include: stations and machines, cranes, employees, and tool and fixture catalog items.
- *Skill-definitions* lists the skills that an employee may possess and the levels of proficiency associated with those skills.
- *Setup-definitions* typically specifies tool or fixture setups on a machine. Tool setups are typically the tools that are required in the tool magazine. Fixture setups are work holding devices mounted on the machine. Setups may also apply to cranes or stations.
- *Operation-definitions* defines the operations that may be performed at a particular station or group of stations in the shop.

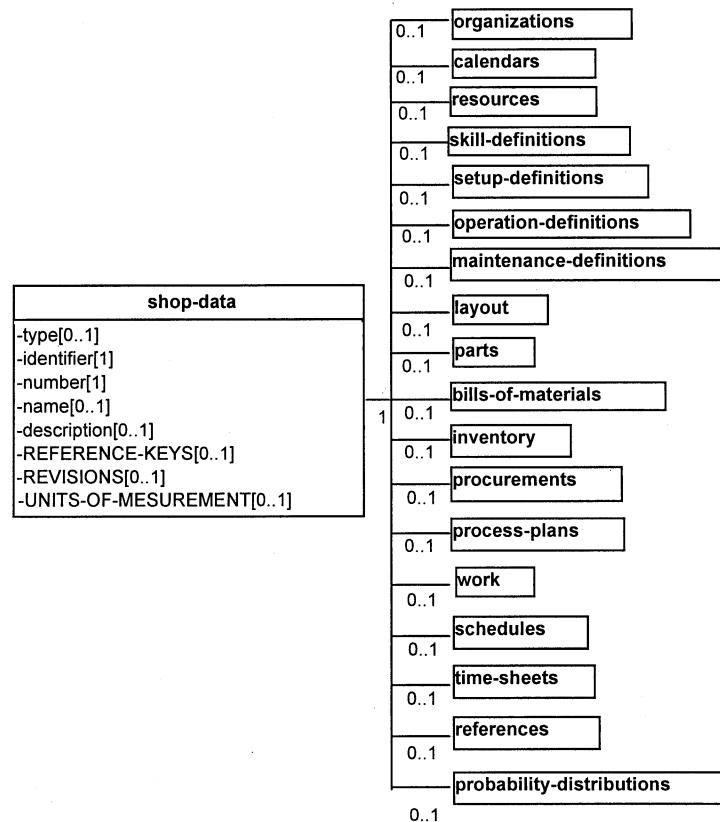


Figure 2: The top structure of the machine shop data model

- *Maintenance-definitions* defines preventive or corrective maintenance to be done on machines or other maintained resources.
- *Layout* defines the location of reference points within the shop, area boundaries, paths, resource, and part objects.

- *Parts* provides elements for part specifications, group technology codes, customers, suppliers, as well as links to bills of materials, process plans, drawings, part models and other references.
- *Bills-of-materials* cross-references the parts and quantities required in a hierarchical bill-of-materials structure.
- *Inventory* identifies the instances and locations for parts, materials, tools, and fixtures inventory.
- *Procurements* identifies the external purchases that have been created to satisfy the part inventory and manufacturing requirements.
- *Process-plans* specifies a set of process plans that are associated with production and support activities for a particular part or parts. A process plan has routing sheets and operation sheets that correspond to the job and task level in the work hierarchy.
- *Work* is used to specify a collection of a hierarchy of production orders, jobs, and tasks. It is also used to specify a collection of internal support orders for maintenance activities, inventory picking and tool preparation.
- *Schedules* lists planned assignment or mapping of work to resources and resources to work.
- *Revisions* specifies information about a set of revisions of the subjects. Information included in the element are each revision's identification, description, date, creators, etc.
- *Time-sheets* provides a list of individual time sheet elements. A time-sheet is used to log the hours that an employee has worked, the time an employee has taken off from work, and accrual of leave hours.
- *Probability-distributions* specifies distributions that are used to vary processing times, breakdown and repair times, and availability of resources, etc.
- *References* describes the information about reference materials that support or further define the data elements contained within the shop data structure.
- *Units-of-measurement* describes various measurement units used in the file, for example, the measurement may be for distance, speed, mass, time duration, or currency.

4. OBJECTIVES OF THE DATABASE IMPLEMENTATION

The objectives of the database implementation effort include:

- to demonstrate the feasibility of the information model,
- to develop a pilot database system and then to migrate to a large database management system, and
- to support the integration of manufacturing applications and simulations used in machine shops.

A database is a collection of related information. It provides a structured means for storing and querying data. Most existing databases are relational databases. A database management system (DBMS), such as Microsoft Access, and Oracle [9], provides software tools for users to organize data in a flexible manner. The database, described in this report, has been developed using Access, a personal computer (PC) based database product. Access comes with the Microsoft Office suite of products and contains many of the features of a relational database management system. Access is more economic to

implement and maintain than mainframe DBMSs. Access is extensible. It has a capability to import and export data with various text file formats and database systems using the data access interface, such as Data Access Objects (DAO) [10], Open Database Connectivity (ODBC) [11], and Dynamic Data Exchange (DDE) [12].

5. DATABASE DEVELOPMENT

A database model is designed to map onto the machine shop information model. The database contains a set of relational tables presented in a tree shape structure. Tables comprise the fundamental blocks of a database. A table is a grouping of selected data organized into fields (columns) and records (rows) on a datasheet. A field identifies a data type for a set of value in a table while a record stores a set of values defined by fields. This section describes the guidelines that are used to develop the database. It also provides samples for a mapping from an XML element to a relational table, a design view of a table, and the relationships between tables.

5.1 Guidelines

The following guidelines are used when developing the database structure:

- Elements in the information model are represented as “tables” in the database model.
- Attributes and child-elements of an element are represented as “fields” in the corresponding table.
- Parent-elements of an element are represented as “fields” in the corresponding table. These fields are required for system maintenance.
- A cardinality relationship is specified with the definition of each field if a child-element exists.
- INDEX is a required field for each table and is used by the system.
- A table name is presented in the lower case.
- A field that serves as a referenced table, or a referencing table, or a system used item (such as INDEX or parent-element) is presented in the upper case. All other fields are presented in the lower case.
- Names used for elements or attributes in the information model are kept the same in the database.
- Enumeration tables have names prefixed with “enumeration-” or “type-”.

5.2 Relational tables and XML elements

Elements in the information model are used to describe fundamental features or common features of machine shop data. They are represented as tables in the database model. Figure 3 is a sample presentation view about the *stock-level-quantities* element. *Stock-level-quantities* specifies the quantities of tools, fixtures, materials, or parts for various purposes and is represented by the following data elements: *allocated-quantity*, *back-order-quantity*, *on-hand-quantity*, *on-order-quantity*, *required-quantity*, *safety-stock-quantity*, and *work-in-progress-quantity*. In Figure 3, *TOOL-INVENTORY-ITEM*, *TOOLSET-INVENTORY-ITEM*, *FIXTURE-INVENTORY-ITEM*, *FIXTURESET-*

INVENTORY-ITEM, *PART-INVENTORY-ITEM* and *MATERIALS-INVENTORY-ITEM* are parent-elements of *stock-level-quantities*.

stock-level-quantities
INDEX
TOOL-INVENTORY-ITEM
TOOLSET-INVENTORY-ITEM
FIXTURE-INVENTORY-ITEM
FIXTURESET-INVENTORY-ITEM
PART-INVENTORY-ITEM
MATERIALS-INVENTORY-ITEM
on-hand-quantity
allocated-quantity
safety-stock-quantity
required-quantity
on-order-quantity
back-order-quantity
work-in-process-quantity

Figure 3: *Stock-level-quantities*

The XML definition of *stock-level-quantities* is presented as follows.

```
<stock-level-quantities>  
  <on-hand-quantity />  
  <allocated-quantity />  
  <safety-stock-quantity />  
  <required-quantity />  
  <on-order-quantity />  
  <back-order-quantity />  
  <work-in-process-quantity />  
</ stock-level-quantities >
```

5.3 Data structure in a design view

In Access, Design View is used to create fields in each table. A design view contains information presented in three columns: Field, Data Type, and Description. The “Field” column identifies attributes of the element and special elements that are used by the database system, or the referenced or referencing tables. The “Data Type” column defines the data type format for the field. The “Description” column is reserved for information about the attribute usage, domain, definition (that defines the internal relationship between tables), reference, cardinality relationship, etc. The cardinality relationship specifies how many specific instances of the child element could be related to the parent element. The cardinality relationship may be one to zero or one, one to zero or more, one to one or more, or exactly “n” occurrences, and is presented in the design view as [0..1], [0..*], [1..*], [n], respectively.

Shop-data is the top level of the data model. The design view of the *shop-data* table is presented in Table 1.

Table 1: Data structure of *shop-data*

Field	Data Type	Description
INDEX	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORGANIZATIONS	Number	[0..1], organizations.SHOP-DATA
CALENDARS	Number	[0..1], calendars.SHOP-DATA
RESOURCES	Number	[0..1], resources.SHOP-DATA
SKILL-DEFINITIONS	Number	[0..1], skill-definitions.SHOP-DATA
OPERATION-DEFINITIONS	Number	[0..1], setup-definitions.SHOP-DATA
SETUP-DEFINITIONS	Number	[0..1], setup-definitions.SHOP-DATA
MAINTENANCE-DEFINITIONS	Number	[0..1], maintenance-definitions.SHOP-DATA
LAYOUT	Number	[0..1], layout.SHOP-DATA
PARTS	Number	[0..1], parts.SHOP-DATA
BILLS-OF-MATERIALS	Number	[0..1], bills-of-materials.SHOP-DATA
INVENTORY	Number	[0..1], inventory.SHOP-DATA
PROCUREMENTS	Number	[0..1], procurements.SHOP-DATA
PROCESS-PLANS	Number	[0..1], process-plans.SHOP-DATA
WORK	Number	[0..1], work.SHOP-DATA
SCHEDULES	Number	[0..1], schedules.SHOP-DATA
TIME-SHEETS	Number	[0..1], time-sheets.SHOP-DATA
REFERENCES	Number	[0..1], references.SHOP-DATA
PROBABILITY-DISTRIBUTIONS	Number	[0..1], probability-distributions.SHOP-DATA
UNITS-OF-MEASUREMENT	Number	[0..1], units-of-measurement.SHOP-DATA

Shop-data is defined by an identifier, a number, and optionally a type, a name, a description, references, revisions, units of measurement, organizations, calendars, resources, skill definitions, setup definitions, operation definitions, maintenance definitions, a layout, parts, bills of materials, an inventory, procurements, process plans, work, schedules, time sheets, and probability distributions. The field *INDEX* in Table 1 is a special element used by the system, its instance should be an integer, and there will be exactly one instance for a *shop-data* instance. *Type* is an attribute of *shop-data* and is an enumeration to describe types about *shop-data*. *Name* is another attribute, and there may be zero or one instance for a *shop-data* instance. *ORGANIZATIONS* is an attribute served as a pointer pointing to the table of *organizations*. A *shop-data* instance may have zero or one instance of *ORGANIZATIONS*. *ORGANIZATIONS* in the *shop-data* table points to the field of *shop-data* in the *organizations* table. *REFERENCE-KEYS* points to the field of *source* in the *reference-keys* table. All referenced tables that are identified in Table 1 can be found in Appendix A.

5.4 Relationships between tables

The machine shop database model can be represented in a tree shape expression. There are different levels of relationships among elements. The first level carries the relationship between *shop-data* element and the major elements such as *revisions*, *organizations*, *calendars*, *resources*, etc. The second level has the relationship among major elements and their referencing elements.

This subsection describes the relationships between the *machines* element and its related elements. *Machines* lists each machine that exists within the shop. The *machine* element provides descriptive information, hourly rate, technical specifications, status, station associations, and reliability data for a machine. *Machines* is a collection of individual *machine* elements. It is referenced by *resources* and it references the elements of *machine*, *machine-group*, *reference-keys*, and *revisions*. *Type*, *identifier*, *number*, *name*, and *description* are attributes of *machines*. Figure 4 demonstrates how *machines* relates to other elements.

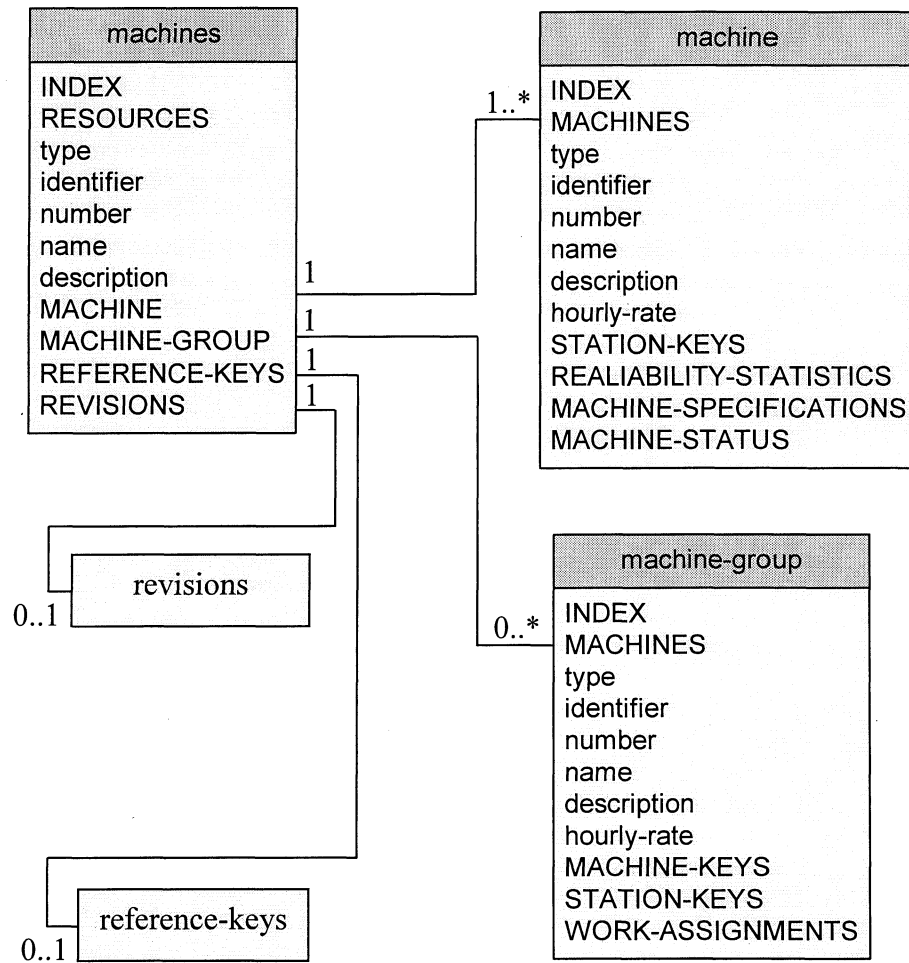


Figure 4: The relationships of *machines*

5.5 Summary of the development

The machine shop database model includes about 500 relational tables. The database model is presented in Appendices A and B. Appendix A presents the table structures for the shop data model. Each table defines a name, its data type and a description for a field. A field may be an attribute, a parent reference, or a child reference. A data type identifies the data format for the field. The data type can be a text string, a number (such as a

double or an integer), or an enumeration. A description presents additional information. Appendix B lists enumeration elements that are used in the database model. Relationships among major manufacturing shop data elements are presented in Appendix C. A set of sample data tables is listed in Appendix D.

6. SAMPLE QUERIES

The Structured Query Language's "SELECT", "CREATE", "INSERT", "DELETE", "UPDATE," etc. are useful to manipulate data from a database [13]. This section demonstrates how to query a database for information.

6.1 Basic query

Basic query is used based on a single table. A sample basic query is introduced here. The *enumeration-units* element has the following fields: *angular-units*, *currency-units*, *distance-units*, *length-units*, *mass-units*, *speed-units*, *time-duration-units*, and *volume-units*. Sample data for *enumeration-units* are presented in Table 2. Table 3 shows the result from the sample query that uses the *enumeration-units* table to retrieve information about unit items applicable to a distance.

The basic query statement is:

```
SELECT [enumeration-units].[distance-units] FROM [enumeration-units];
```

Table 2: Enumeration items for *enumeration-units* (Query Input)

angular-units	currency-units	distance-units	length-units	mass-units	speed-units	time-duration-units	volume-units
DEGREE	DOLLAR	MILE	MILE	TON	MILE/HOUR	DAY	OUNCE
RADIAN	EURO	FOOT	FOOT	POUND	KILOMETER/HOUR	HOUR	CUBICFOOT
	YEN	INCH	INCH	OUNCE		MINUTE	LITER
		KILOMETER	KILOMETER	KILOGRAM		SECOND	GALLON
		METER	METER	GRAM			MILLILITER
		CENTIMETER	CENTIMETER				CUBICMETER
							CUBICINCH
							CUBICCENTIMETER

Table 3: Enumeration items for *distance-units* (Query Output)

distance-units
MILE
FOOT
INCH
KILOMETER
METER
CENTIMETER

6.2 Complex query

Complex queries are used in programs or database operations. The database can be manipulated using database interfaces such as Data Access DAO and ODBC. User can directly manipulate the tables and records by database interfaces, for example, using a *make-table* query, a *cross-table* query or a *parameter* query. The *make-table* query creates a new table from all or part of the data in one or more tables. The *cross-table* query is a summary query that gives the user control over how the summary data appeared on the screen. The *cross-table* query generates a two-dimensional summary matrix created from tables. The results are displayed in a row/column spreadsheet-like format. The *parameter* query is a query that prompts the user for the criteria each time the query is run.

A sample complex query is described here. The source data comes from Appendix D. Table 4 shows the result from the following query.

The query conditions are:

- (1) *shift-schedule.name* ="human-operated-machines-Fall2002"
- (2) *shift.number* ="dms-one-of-two-shifts-five-days"
- (3) Query for *shift-schedule.name*, *shift.number*, *shift.start-time*, *shift.end-time* and *shift.duration*.

The query statement is:

```
SELECT [shift-schedule].name, shift.number, shift.[start-time], shift.[end-time],
shift.duration FROM ([shift-schedule] INNER JOIN shifts ON [shift-schedule].SHIFTS
= shifts.[SHIFT-SCHEDULE]) INNER JOIN shift ON shifts.SHIFT = shift.SHIFTS
WHERE ((([shift-schedule].name)="human-operated-machines-Fall2002") AND
((shift.number)="dms-one-of-two-shifts-five-days"));
```

Table 4: Output of the sample complex query

shift-schedule.name	shift.number	shift.start-time	shift.end-time	shift.duration
human-operated-machines-Fall2002	dms-one-of-two-shifts-five-days	8:00:00 AM	3:59:00 PM	480

7. CONCLUSIONS AND FUTURE WORK

This report described the work being carried out at MSID in developing a database model for the machine shop data. The objectives of the database development are to demonstrate the feasibility of the information model, to develop a pilot database system and then to migrate to a large database management system, and to support the integration of manufacturing applications and simulations used in machine shops.

The information model will continue to evolve based on the experience and feedback from others involved in this effort. The model is now being transformed into a schema

using an XML schema language. There are also plans to expand the model to include assembly line, supply chain, and other domain areas. Thus the database model will be revised accordingly.

The information model will be proposed as a candidate standard to be considered by a formal standards body. There are also experimental development activities underway to test the viability of the model with real world applications. A generic manufacturing simulator is being developed at NIST for the TIDE Program [4]. The model is also being used in the TIDE Program to integrate a manufacturing execution system with a real-time adaptive scheduler, and the manufacturing simulator. Future work also includes the development of the translators that exchange data among XML, the database, and certain proprietary shop data based on the machine shop information model.

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Appendix A: Data Structures

Table a-weighted-element

Fields	Data Type	Description
INDEX	Number	[1], system use
LOGICAL-STRUCTURE	Number	[1], system use
a-key	Text	[1]
a-score	Text	[1]

Table actual-costs

Fields	Data Type	Description
INDEX	Number	[1], system use
COST-SUMMARY	Number	[1], system use
COST-CATEGORIES	Number	[1], cost-categories.ACTUAL-COSTS

Table address

Fields	Data Type	Description
INDEX	Number	[1], system use
ADDRESSES	Number	[1], system use
PHONE	Number	[0..*], phone.ADDRESS
EMAIL	Number	[0..*], email.ADDRESS
MAIL	Number	[0..*], mail.ADDRESS

Table addresses

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE	Number	[1], system use
CONTACT	Number	[1], system use
ORGANIZATION	Number	[1], system use
DEPARTMENT	Number	[1], system use
POSITION	Number	[1], system use
ADDRESS	Number	[1..*], address.ADDRESSES

Table annual-leave-accrual-rate

Fields	Data Type	Description
INDEX	Number	[1], system use
PAY-STATUS	Number	[1], system use
rate	Number /Double (Fixed)	[1]
time-units	Enumeration	[0..1]
accrual-period	Number /Double (Fixed)	[0..1]

Table area

Fields	Data Type	Description
INDEX	Number	[1], system use
AREAS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
FROM-REFERENCE-FRAME	Number	[0..1], from-reference-frame.AREA
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
AREA-BOUNDARY	Number	[1..*], area-boundary.AREA

Table area-boundary

Fields	Data Type	Description
INDEX	Number	[1], system use
AREA	Number	[1], system use
BOUNDARY-ELEMENT	Number	[1..*], boundary-element.AREA-BOUNDARY

Table areas

Fields	Data Type	Description
INDEX	Number	[1], system use
LAYOUT	Number	[1], system use
AREA	Number	[1..*], area.AREAS

Table availability-exception

Fields	Data Type	Description
INDEX	Number	[1], system use
AVAILABILITY-EXCEPTIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
EVENTS	Number	[1], events.AVAILABILITY-EXCEPTION

Table availability-exceptions

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-AVAILABILITY	Number	[1], system use
AVAILABILITY-EXCEPTION	Number	[1..*], availability-exception.AVAILABILITY-EXCEPTIONS

Table batch-size

Fields	Data Type	Description
INDEX	Number	[1], system use
BATCH-SIZES	Number	[1], system use
PART-KEY	Number	[1], part-key.BATCH-SIZE
quantity	Number /Integer	[1]

Table batch-sizes

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN	Number	[1], system use
ROUTING-SHEET	Number	[1], system use
OPERATION-SHEET	Number	[1], system use
MACHINE-PROGRAM	Number	[1], system use
BATCH-SIZE	Number	[1..*], batch-size.BATCH-SIZES

Table bill-of-materials

Fields	Data Type	Description
INDEX	Number	[1], system use
BILLS-OF-MATERIALS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART-KEY	Number	[0..1], part-key.BILL-OF-MATERIALS
BOM-ELEMENTS	Number	[0..1], bom-elements.BILL-OF-MATERIALS

Table bill-of-materials-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PART	Number	[1], system use
bill-of-materials-identifier	Number	[1]
bill-of-materials-number	Text	[1]

Table bills-of-materials

Fields	Data Type	Description
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INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
BILL-OF-MATERIALS	Number	[1..*], bill-of-materials.BILLS-OF-MATERIALS

Table bom-element

Fields	Data Type	Description
INDEX	Number	[1], system use
BOM-ELEMENTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
PART-QUANTITIES	Number	[0..1], part-quantities.BOM-ELEMENT
CHILD-BOM-ELEMENTS	Number	[0..1], child-bom-elements.BOM-ELEMENT

Table bom-element-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CHILD-BOM-ELEMENTS	Number	[1], system use
bom-element-identifier	Number	[1]
bom-element-number	Text	[1]

Table bom-elements

Fields	Data Type	Description
INDEX	Number	[1], system use
BILL-OF-MATERIALS	Number	[1], system use
BOM-ELEMENT	Number	[1..*], bom-element.BOM-ELEMENTS

Table boundary-element

Fields	Data Type	Description
INDEX	Number	[1], system use
AREA-BOUNDARY	Number	[1], system use
PATH-ROUTE	Number	[1], system use
OBJECT-	Number	[1], system use

BOUNDARY		
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]

Table break

Fields	Data Type	Description
INDEX	Number	[1], system use
BREAKS	Number	[1], system use
start-time	Date/Time	[1], hh:mm:ss
end-time	Date/Time	[0..1], hh:mm:ss
duration	Number /Double (Fixed)	[0..1]

Table breaks

Fields	Data Type	Description
INDEX	Number	[1], system use
SHIFT	Number	[1], system use
BREAK	Number	[1..*], break.BREAKS

Table calendar

Fields	Data Type	Description
INDEX	Number /Integer	[1], system use
CALENDARS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
effective-start-date	Date/Time	[1], yyyy-mm-dd
effective-end-date	Date/Time	[1], yyyy-mm-dd
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SHIFT-SCHEDULE	Number	[1..*], shift-schedule.CALENDAR

Table calendar-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CALENDAR-MULTI-KEY	Number	[1], system use
calendar-identifier	Number	[1]
calendar-number	Text	[1]

Table calendar-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
EFFECTIVE-SHIFT	Number	[1], system use
DEPARTMENT	Number	[1], system use
CALENDAR-KEY	Number	[0..1], calendar-key.CALENDAR-MULTI-KEY
SHIFT-SCHEDULE-KEY	Number	[0..1], shift-schedule-key.CALENDAR-MULTI-KEY
SHIFT-KEY	Number	[0..1], shift-key.CALENDAR-MULTI-KEY

Table calendars

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
CALENDAR	Number	[1..*], calendar.CALENDARS

Table child-bom-elements

Fields	Data Type	Description
INDEX	Number	[1], system use
BOM-ELEMENT	Number	[1], system use
BOM-ELEMENT-KEY	Number	[1..*], bom-element-key.CHILD-BOM-ELEMENTS

Table child-department-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
DEPARTMENT	Number	[1], system use
ORGANIZATION-KEY	Number	[0..1], organization-key.CHILD-DEPARTMENT-MULTI-KEY
DEPARTMENT-KEY	Number	[1..*], department-key.CHILD-DEPARTMENT-MULTI-KEY

Table child-setup-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DEFINITION	Number	[1], system use

SETUP-DEFINITION-KEY	Number	[1..*], setup-definition-key.CHILD-SETUP-KEYS
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Table child-work-items

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
WORK-KEYS	Number	[1], work-keys.CHILD-WORK-ITEMS
WORK-ITEM-GROUP	Number	[1..*], work-item-group.CHILD-WORK-ITEMS

Table component-part-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
COMPONENT-PART-MULTI-KEYS	Number	[1], system use
PART-KEY	Number	[0..1], part-key.COMPONENT-PART-MULTI-KEY
PART-INVENTORY-ITEM-KEY	Number	[0..1], part-inventory-item-key.COMPONENT-PART-MULTI-KEY
PART-INSTANCE-KEY	Number	[0..1], part-instance-key.COMPONENT-PART-MULTI-KEY

Table component-part-multi-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-INSTANCE	Number	[1], system use
COMPONENT-PART-MULTI-KEY	Number	[1..*], component-part-multi-key.COMPONENT-PART-MULTI-KEYS

Table contact

Fields	Data Type	Description
INDEX	Number	[1], system use
CONTACTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
ADDRESSES	Number	[1], addresses.CONTACT

Table contact-key

Fields	Data Type	Description
INDEX	Number	[1], system use
ORGANIZATIONAL-CONTACT	Number	[1], system use
contact-identifier	Number	[1]
contact-number	Text	[1]

Table contacts

Fields	Data Type	Description
INDEX	Number	[1], system use
ORGANIZATION	Number	[1], system use
DEPARTMENT	Number	[1], system use
CONTACT	Number	[1..*], contact.CONTACTS

Table cost-categories

Fields	Data Type	Description
INDEX	Number	[1], system use
ESTIMATED-COSTS	Number	[1], system use
PLANNED-COSTS	Number	[1], system use
ACTUAL-COSTS	Number	[1], system use
materials-cost	Number /Double	[0..1]
labor-cost	Number /Double	[0..1]
equipment-usage-cost	Number /Double	[0..1]
total-cost	Number /Double	[0..1]

Table cost-summary

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use
ORDER-DEFINITION	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[1], system use
WORK-ACTUAL-PROGRESS	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-ITEM-DEFINITION	Number	[1], system use

TOOL-ORDER-DEFINITION	Number	[1], system use
MAINTENANCE-DEFINITION	Number	[1], system use
ESTIMATED-COSTS	Number	[0..1], estimated-costs.COST-SUMMARY
PLANNED-COSTS	Number	[0..1], planned-costs.COST-SUMMARY
ACTUAL-COSTS	Number	[0..1], actual-costs.COST-SUMMARY

Table crane

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
hourly-rate	Number /Double (Fixed)	[0..1]
LOCATIONS-SERVED-KEYS	Number	[0..1], locations-served-keys.CRANE
RELIABILITY-STATISTICS	Number	[0..1], reliability-statistics.CRANE
CRANE-SPECIFICATION	Number	0..1], crane-specification.CRANE
CRANE-STATUS	Number	[0..1], crane-status.CRANE

Table crane-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANES-ASSIGNED	Number	[1], system use
CRANE-KEY	Number	[1], crane-key.CRANE-ASSIGNED
SETUP-DEFINITION-KEYS	Number	[0..1], setup-definition-keys.CRANE-ASSIGNED
EVENTS	Number	[0..1], events.CRANE-ASSIGNED

Table crane-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE-KEYS	Number	[1], system use

CRANE-ASSIGNED	Number	[1], system use
CRANE-USED	Number	[1], system use
MAINTAINED-RESOURCE-KEYS	Number	[1], system use
SETUP-RESOURCES-KEYS	Number	[1], system use
CRANE-SCHEDULE	Number	[1], system use
crane-identifier	Number	[1]
crane-number	Text	[1]

Table crane-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE-REQUIRED	Number	[1], system use
CRANE-KEY	Number	[1..*], crane-key.CRANE-KEYS

Table crane-required

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANES-REQUIRED	Number	[1], system use
minimum-cranes	Number /Integer	[1]
maximum-cranes	Number /Integer	[1]
CRANE-KEYS	Number	[1], crane-keys.CRANE-REQUIRED
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.CRANE-REQUIRED

Table crane-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANES-SECTION	Number	[1], system use
CRANE-KEY	Number	[1], crane-key.CRANE-SCHEDULE
WORK-ASSIGNMENTS	Number	[1], work-assignemnts.CRANE-SCHEDULE

Table crane-specifications

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE	Number	[1], system use
manufacturer	Text	[0..1]
model-number	Text	[1]
serial-number	Text	[0..1]
horsepower	Number	[0..1]

	/Double	
maximum-load-capacity	Number /Double	[0..1]
speed	Number /Double	[0..1]

Table crane-status

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE	Number	[1], system use
operational-state	Enumeration	[0..1]
maintenance-state	Enumeration	[0..1]
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.CRANE-STATUS
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.CRANE-STATUS

Table crane-used

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANES-USED	Number	[1], system use
CRANE-KEY	Number	[1], crane-key.CRANE-USED
SETUP-DEFINITION-KEYS	Number	[0..1], setup-definition-keys.CRANE-USED
EVENTS	Number	[0..1], events.CRANE-USED

Table cranes

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
CRANE	Number	[1..*], crane.CRANES

Table cranes-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-ASSIGNED	Number	[1], system use
number-of-cranes	Number	[1]

	/Integer	
CRANE-ASSIGNED	Number	[1..*], crane-assigned.CRANES-ASSIGNED

Table cranes-required

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-REQUIRED	Number	[1], system use
CRANE-REQUIRED	Number	[1..*], crane-required.CRANES-REQUIRED

Table cranes-section

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-SECTION	Number	[1], system use
CRANE-SCHEDULE	Number	[1..*], crane-schedule.CRANES-SECTION

Table cranes-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
number-of-cranes	Number /Integer	[1]
CRANE-USED	Number	[1..*], crane-used.CRANES-USED

Table creator

Fields	Data Type	Description
INDEX	Number	[1], system use
CREATORS	Number	[1], system use
ORGANIZATION-KEY	Number	[0..1], organization-key.CREATOR
DEPARTMENT-KEY	Number	[0..1], department-key.CREATOR
EMPLOYEE-KEY	Number	[0..1], employee-key.CREATOR

Table creators

Fields	Data Type	Description
INDEX	Number	[1], system use
REVISION	Number	[1], system use
CREATOR	Number	[1..*], creator.CREATORS

Table current-setup

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-CHANGEOVER	Number	[1], system use

SETUP-DEFINITION-KEY	Number	[1], setup-definition-key.CURRENT-SETUP
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Table customers

Fields	Data Type	Description
INDEX	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
ORDER-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-DEFINITION	Number	[1], system use
TOOL-ORDER-DEFINITION	Number	[1], system use
PART	Number	[1], system use
ORGANIZATIONAL-CONTACT	Number	[1,*], organizational-contact.CUSTOMERS

Table day-of-week

Fields	Data Type	Description
INDEX	Number	[1], system use
DAYS-OF-WEEK	Number	[1], system use
day-number	Enumeration	[0..1]
day-name	Enumeration	[1]

Table days-of-week

Fields	Data Type	Description
INDEX	Number	[1], system use
SHIFT	Number	[1], system use
DAY-OF-WEEK	Number	[1..*], day-of-week.DAYS-OF-WEEK

Table department

Fields	Data Type	Description
INDEX	Number	[1], system use
DEPARTMENTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
level	Text	[0..1]
CONTACTS	Number	[0..1], contacts.DEPARTMENT
ADDRESSES	Number	[0..1], addresses.DEPARTMENT

CALENDAR-MULTI-KEY	Number	[0..1], calendar-multi-key.DEPARTMENT
CHILD-DEPARTMENT-MULTI-KEY	Number	[0..1], child-department-multi-key.DEPARTMENT
POSITIONS	Number	[1..*], positions.DEPARTMENT

Table department-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CREATOR	Number	[1], system use
ORGANIZATIONAL-CONTACT	Number	[1], system use
POSITION-MULTI-KEY	Number	[1], system use
CHILD-DEPARTMENT-MULTI-KEY	Number	[1], system use
department-identifier	Number	[1]
department-number	Text	[1]

Table departments

Fields	Data Type	Description
INDEX	Number	[1], system use
ORGANIZATION	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
priority-rating	Enumeration	[0..1]
DEPARTMENT	Number	[1..*], department.DEPARTMENTS

Table digital-file-properties

Fields	Data Type	Description
INDEX	Number	[1], system use
DIGITAL-FILES	Number	[1], system use
server-system-name	Text	[0..1]
server-drive	Text	[0..1]
server-directory	Text	[0..1]
file-name	Text	[0..1]
file-extension	Text	[0..1]
file-format	Text	[0..1]
application-name	Text	[0..1]
application-version	Text	[0..1]

uniform-resource-indicator	Text	[0..1]
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Table digital-files

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCE	Number	[1], system use
DIGITAL-FILE-PROPERTIES	Number	[1..*], digital-file-properties.DIGITAL-FILES

Table dimension

Fields	Data Type	Description
INDEX	Number	[1], system use
DIMENSIONS	Number	[1], system use
type	Enumeration	[0..1]
value	Number /Double	[1]

Table dimensions

Fields	Data Type	Description
INDEX	Number	[1], system use
MATERIAL-INSTANCE	Number	[1], system use
DIMENSION	Number	[1..*], dimension.DIMENSIONS

Table due-dates

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-DEFINITION	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-ITEM-DEFINITION	Number	[1], system use
TOOL-ORDER-DEFINITION	Number	[1], system use
PROCUREMENT-DEFINITION	Number	[1], system use

PROCUREMENT-ITEM-DEFINITION	Number	[1], system use
release-date	Date/Time	[0..1], yyyy-mm-dd
requested-earliest-ship-date	Date/Time	[0..1], yyyy-mm-dd
requested-latest-ship-date	Date/Time	[0..1], yyyy-mm-dd

Table duration-distributions

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DURATION	Number	[1], system use
UNIT-OPERATION-DURATION	Number	[1], system use
TOTAL-OPERATIONS-DURATION	Number	[1], system use
MEAN-TIME-BETWEEN-FAILURES	Number	[1], system use
MEAN-TIME-TO-REPAIR	Number	[1], system use
PROBABILITY-DISTRIBUTION-KEY	Number	[0..*], probability-distribution-key.DURATION-DISTRIBUTIONS
PROBABILITY-DISTRIBUTION	Number	[0..*], probability-distribution.DURATION-DISTRIBUTIONS

Table effective-shift

Fields	Data Type	Description
INDEX	Number	[1], system use
EFFECTIVE-SHIFTS	Number	[1], system use
effective-start-date	Date/Time	[1], yyyy-mm-dd
effective-end-date	Date/Time	[1], yyyy-mm-dd
CALENDAR-MULTI-KEY	Number	[1], calendar-multi-key.EFFECTIVE-SHIFT

Table effective-shifts

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-AVAILABILITY	Number	[1], system use
EFFECTIVE-SHIFT	Number	[1..*], effective-shift.EFFECTIVE-SHIFTS

Table email

Fields	Data Type	Description
INDEX	Number	[1], system use
ADDRESS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
email-address	Text	[1]

Table employee

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
employment-status	Enumeration	[0..1]
ADDRESSES	Number	[0..1], addresses.EMPLOYEE
POSITION-MULTI-KEYS	Number	[0..1], position-multi-keys.EMPLOYEE
SKILL-MULTI-KEYS	Number	[0..1], skill-multi-keys.EMPLOYEE
EMPLOYEE-STATUS	Number	[0..1], employee-status.EMPLOYEE

Table employee-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEES-ASSIGNED	Number	[1], system use
number-of-employees	Number Integer	[1]
EMPLOYEE-KEY	Number	[1], employee-key.EMPLOYEE-ASSIGNED
EVENTS	Number	[0..1], events.EMPLOYEE-ASSIGNED

Table employee-availability

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-STATUS	Number	[1], system use
EFFECTIVE-SHIFTS	Number	[1], effective-shifts.EMPLOYEE-AVAILABILITY
AVAILABILITY-EXCEPTIONS	Number	[0..1], availability-exceptions.EMPLOYEE-AVAILABILITY

Table employee-key

Fields	Data Type	Description
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INDEX	Number	[1], system use
CREATOR	Number	[1], system use
EMPLOYEE-KEYS	Number	[1], system use
EMPLOYEE-ASSIGNED	Number	[1], system use
EMPLOYEE-USED	Number	[1], system use
EMPLOYEE-SCHEDULE	Number	[1], system use
TIME-SHEET	Number	[1], system use
employee-identifier	Number	[1]
employee-number	Text	[1]

Table employee-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-REQUIRED	Number	[1], system use
STATION-STATUS	Number	[1], system use
STATION-GROUP	Number	[1], system use
POSITION	Number	[1], system use
EMPLOYEE-KEY	Number	[1..*], employee-key.EMPLOYEE-KEYS

Table employee-required

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEES-REQUIRED	Number	[1], system use
minimum-employees	Number /Integer	[1]
maximum-employees	Number /Integer	[1]
EMPLOYEE-KEYS	Number	[0..1], employee-keys.EMPLOYEE-REQUIRED
SKILL-MULTI-KEYS	Number	[0..1], skill-multi-keys.EMPLOYEE-REQUIRED

Table employee-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEES-SECTION	Number	[1], system use
EMPLOYEE-KEY	Number	[1], employee-key.EMPLOYEE-SCHEDULE
WORK-ASSIGNMENTS	Number	[1], work-assignemnts.EMPLOYEE-SCHEDULE

Table employee-status

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE	Number	[1], system use
WORK-ASSIGNMENTS	Number	[0..1], work-assignments-EMPLOYEE-STATUS
EMPLOYEE-AVAILABILITY	Number	[0..1], employee-availability-EMPLOYEE-STATUS
PAY-STATUS	Number	[0..1], pay-status-EMPLOYEE-STATUS

Table employee-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
PART-QUANTITIES	Number	[1], part-quantities.PARTS-USED
PART-INSTANCE-KEY	Number	[0..*], part-instance-key.PARTS-USED

Table employees

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
EMPLOYEE	Number	[1..*], employee.EMPLOYEES

Table employees-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-ASSIGNED	Number	[1], system use
number-of-employees	Number /Integer	[1]
EMPLOYEE-ASSIGNED	Number	[1..*], employee-assigned.EMPLOYEES-ASSIGNED

Table employees-required

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-	Number	[1], system use

REQUIRED		
EMPLOYEE-REQUIRED	Number	[1..*], employee-required.EMPLOYEES-REQUIRED

Table employees-section

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-SECTION	Number	[1], system use
EMPLOYEE-SCHEDULE	Number	[1..*], employee-schedule.EMPLOYEES-SECTION

Table employees-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
number-of-employees	Number /Integer	[1]
EMPLOYEE-USED	Number	[1..*], employee-used.EMPLOYEES-USED

Table enumeration-behavior

Fields	Data Type	Description
in-layout	Text	[1..*]

Table enumeration-controller-type

Fields	Data Type	Description
in-machine-program	Text	[1..*]
in-machines	Text	[1..*]

Table enumeration-day-name

Fields	Data Type	Description
in-calendars	Text	[1..*]

Table enumeration-day-number

Fields	Data Type	Description
in-day-number	Number	[1..*]
in-day-name	Text	[1..*]

Table enumeration-efficiency-rating

Fields	Data Type	Description
in-machines	Text	[1..*]

Table enumeration-employment-status

Fields	Data Type	Description
in-employees	Text	[1..*]

Table enumeration-file-format

Fields	Data Type	Description
in-references	Text	[1..*]

Table enumeration-logical-relationship

Fields	Data Type	Description
in-child-work	Text	[1..*]
in-plan-definition	Text	[1..*]
in-precedent-constraints	Text	[1..*]

Table enumeration-maintenance-state

Fields	Data Type	Description
in-cranes	Text	[1..*]
in-machines	Text	[1..*]
in-stations	Text	[1..*]

Table enumeration-material-type

Fields	Data Type	Description
in-materials-inventory	Text	[1..*]

Table enumeration-operational-state

Fields	Data Type	Description
in-cranes	Text	[1..*]
in-machines	Text	[1..*]
in-stations	Text	[1..*]

Table enumeration-operation-subtype

Fields	Data Type	Description
in-operation-definitions	Text	[1..*]

Table enumeration-operation-type

Fields	Data Type	Description
in-operation-definitions	Text	[1..*]

Table enumeration-overtime-eligibility

Fields	Data Type	Description
in-employees	Text	[1..*]
in-time-sheets	Text	[1..*]

Table enumeration-priority-rating

Fields	Data Type	Description
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in-departments	Number	[1..*]
in-organizations	Number	[1..*]
in-procurements	Text	[1..*]
in-work	Text	[1..*]

Table enumeration-salary-type

Fields	Data Type	Description
in-employees	Text	[1..*]

Table enumeration-status-code

Fields	Data Type	Description
in-inventory	Text	[1..*]
in-work-actual-progress	Text	[1..*]
in-work-actual-progress	Text	[1..*]
in-default	Text	[1..*]
in-value	Text	[1..*]

Table enumeration-units

Fields	Data Type	Description
angular-units	Text	[1..*]
currency-units	Text	[1..*]
distance-units	Text	[1..*]
length-units	Text	[1..*]
mass-units	Text	[1..*]
speed-units	Text	[1..*]
time-duration-units	Text	[1..*]
volume	Text	[1..*]

Table estimated-costs

Fields	Data Type	Description
INDEX	Number	[1], system use
COST-SUMMARY	Number	[1], system use
COST-CATEGORIES	Number	[1], cost-categories.ESTIMATED-COSTS

Table estimated-durations

Fields	Data Type	Description
INDEX	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
NEW-SETUP	Number	[1], system use
MAINTENANCE-DEFINITION	Number	[1], system use
PLAN-DEFINITION	Number	[1], system use
PLAN-STEP	Number	[1], system use

MACHINE-PROGRAM	Number	[1], system use
SETUP-DURATION	Number	[0..1], setup-duration.ESTIMATED-DURATION
UNIT-OPERATION-DURATION	Number	[0..1], unit-operation-duration.ESTIMATED-DURATION
TOTAL-OPERATIONS-DURATION	Number	[0..1], total-operations-duration.ESTIMATED-DURATION

Table event

Fields	Data Type	Description
INDEX	Number	[1], system use
EVENTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
date	Date/Time	[1], yyyy-mm-dd
time	Date/Time	[1], hh:mm:ss

Table events

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[1], system use
WORK-ACTUAL-PROGRESS	Number	[1], system use
STATION-ASSIGNED	Number	[1], system use
MACHINE-ASSIGNED	Number	[1], system use
EMPLOYEE-ASSIGNED	Number	[1], system use
CRANE-ASSIGNED	Number	[1], system use
STATION-USED	Number	[1], system use
MACHINE-USED	Number	[1], system use
EMPLOYEE-USED	Number	[1], system use
CRANE-USED	Number	[1], system use
WORK-ASSIGNMENT	Number	[1], system use
AVAILABILITY-EXCEPTION	Number	[1], system use
PROCUREMENT-	Number	[1], system use

ITEM-STATUS		
PROCUREMENT-STATUS	Number	[1], system use
EVENT	Number	[1..*], event.EVENTS

Table fixture-catalog

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
FIXTURE-DEFINITION	Number	[1..*], fixture-definition.FIXTURE-CATALOG
FIXTURESET-DEFINITION	Number	[0..*], fixtureset-definition.FIXTURE-CATALOG

Table fixture-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURE-CATALOG	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART-KEY	Number	[0..1], part-key.FIXTURE-DEFINITION

Table fixture-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-COMPONENTS	Number	[1], system use
FIXTURESET-MEMBER-KEYS	Number	[1], system use
FIXTURE-INVENTORY-ITEM	Number	[1], system use
fixture-definition-	Number	[1]

identifier		
fixture-definition-number	Text	[1]

Table fixture-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURE-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code.FIXTURE-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments. FIXTURE-INSTANCE

Table fixture-instance-key

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURE-INSTANCE-KEYS	Number	[1], system use
fixture-instance-identifier	Number	[1]
fixture-instance-number	Text	[1]

Table fixture-instance-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURESET-INSTANCE	Number	[1], system use
FIXTURE-INSTANCE-KEY	Number	[1..*], fixture-instance-key.FIXTURE-INSTANCE-KEYS

Table fixture-instances

Fields	Data Type	Description
INDEX	Number	[1], system use
FXITURE-INVENTORY-ITEM	Number	[1], system use
FXITURE-INSTANCE	Number	[1..*], fixture-instance.FXITURE-INSTANCES

Table fixture-inventory

Fields	Data Type	Description
INDEX	Number	[1], system use
INVENTORY	Number	[1], system use
FIXTURE- INVENTORY-ITEM	Number	[1..*], fixture-inventory-item.FIXTURE- INVENTORY
FIXTURESET- INVENTORY-ITEM	Number	[0..*], fixtureset-inventory-item.FIXTURE- INVENTORY

Table fixture-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURE- INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
FIXTURE- DEFINITION-KEY	Number	[1], fixture-definition-key.FIXTURE- INVENTORY-ITEM
STOCK-LEVEL- QUANTITIES	Number	[1], stock-level-quantities.FIXTURE- INVENTORY-ITEM
PROCUREMENT- MULTI-KEYS	Number	[0..1], procurement-multi-keys.FIXTURE- INVENTORY-ITEM
FIXTURE- INSTANCES	Number	[0..1], fixture-instances.FIXTURE- INVENTORY-ITEM

Table fixtureset-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURESET- CATALOG	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
FIXTURESET- MEMBER-KEYS	Number	[1], fixtureset-member-keys.FIXTURE- DEFINITION

Table fixtureset-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-COMPONENTS	Number	[1], system use
FIXTURESET-MEMBER-KEYS	Number	[1], system use
FIXTURESET-INVENTORY-ITEM	Number	[1], system use
fixtureset-definition-identifier	Number	[1]
fixtureset-definition-number	Text	[1]

Table fixtureset-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURESET-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code. FIXTURESET-INSTANCE
FIXTURE-INSTANCE-KEYS	Number	[1], fixture-instance-keys.FIXTURESET-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.FIXTURESET-INSTANCE

Table fixtureset-instances

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURESET-INVENTORY-ITEM	Number	[1], system use
FIXTURESET-INSTANCE	Number	[1..*], fixtureset-instance.FIXTURESET-INSTANCES

Table fixtureset-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURE-INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]

number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
FIXTURESET-DEFINITION-KEY	Number	[1], fixtureset-definition-key.FIXTURESET-INVENTORY-ITEM
STOCK-LEVEL-QUANTITIES	Number	[1], stock-level-quantities.FIXTURESET-INVENTORY-ITEM
PROCUREMENT-MULTI-KEYS	Number	[0..1], procurement-multi-keys.FIXTURESET-INVENTORY-ITEM
FIXTURESET-INSTANCES	Number	[0..1], fixtureset-instances.FIXTURESET-INVENTORY-ITEM

Table fixtureset-member-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
FIXTURESET-DEFINITION	Number	[1], system use
FIXTURE-DEFINITION-KEY	Number	[0..*], fixture-definition-key.FIXTURESET-MEMBER-KEYS
FIXTURESET-DEFINITION-KEY	Number	[0..*], fixtureset-definition-key.FIXTURESET-MEMBER-KEYS

Table from-reference-frame

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCE-FRAME	Number	[1], system use
AREA	Number	[1], system use
PATH	Number	[1], system use
RESOURCE-OBJECT	Number	[1], system use
PART-OBJECT	Number	[1], system use
REFERENCE-FRAME-KEY	Number	[1], reference-frmae-key.FROM-REFERENCE-FRAME
TRANSLATION	Number	[0..1], translation.FROM-REFERENCE-FRAME
SCALING	Number	[0..1], scaling.FROM-REFERENCE-FRAME
ROTATION	Number	[0..1], rotation.FROM-REFERENCE-FRAME

Table group-technology-code

Fields	Data Type	Description
INDEX	Number	[1], system use
PART	Number	[1], system use
shape-code	Text	[0..1]
material-code	Text	[0..1]

color-code	Text	[0..1]
surface-finish-code	Text	[0..1]
function-code	Text	[0..1]
weight-code	Text	[0..1]
process-code	Text	[0..1]
cost-code	Text	[0..1]

Table holiday

Fields	Data Type	Description
INDEX	Number	[1], system use
HOLIDAYS	Number	[1], system use
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
date	Date/Time	[1], yyyy-mm-dd

Table holidays

Fields	Data Type	Description
INDEX	Number	[1], system use
SHIFT-SCHEDULE	Number	[1], system use
HOLIDAY	Number	[1..*], holiday.HOLIDAYS

Table inventory

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOL-INVENTORY	Number	[0..1], tool-inventory.INVENTORY
FIXTURE-INVENTORY	Number	[0..1], fixture-inventory.INVENTORY
PART-INVENTORY	Number	[0..1], part-inventory.INVENTORY
MATERIALS-INVENTORY	Number	[0..1], materials-inventory.INVENTORY

Table job

Fields	Data Type	Description
INDEX	Number	[1], system use
JOBS	Number	[1], system use

type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
JOB-DEFINITION	Number	[0..1], job-definition.JOB
JOB-STATUS	Number	[0..1], job-status.JOB

Table job-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
JOB	Number	[1], system use
CUSTOMERS	Number	[0..1], customers.JOB-DEFINITION
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.JOB-DEFINITION
PART-QUANTITIES	Number	[1], part-quantities.JOB-DEFINITION
PROCESS-PLAN-MULTI-KEY	Number	[0..1], process-plan-multi-key.JOB-DEFINITION
repetition-count	Number /Integer	[0..1]
PARAMETERS	Number	[0..1], parameters.JOB-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.JOB-DEFINITION
CHILD-WORK-ITEMS	Number	[0..1], child-work-items.JOB-DEFINITION
PRECEDENT-CONSTRAINTS	Number	[0..1], precedent-constraints.JOB-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.JOB-DEFINITION

Table job-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
JOB-SCHEDULE	Number	[1], system use
job-identifier	Number	[1]
job-number	Text	[1]

Table job-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
JOBS-SECTION	Number	[1], system use
JOB-KEY	Number	[1], jobi.key.JOB-SCHEDULE
RESOURCES-	Number	[1], resources-assigned.JOB-SCHEDULE

ASSIGNED		
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Table job-status

Fields	Data Type	Description
INDEX	Number	[1], system use
JOB	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.JOB-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.JOB-STATUS

Table jobs

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
JOB	Number	[1..*], job.JOBS

Table jobs-section

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use
JOB-SCHEDULE	Number	[1..*], job-schedule.JOBS-SECTION

Table layout

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
REFERENCE-FRAMES	Number	[0..1], reference-frames.LAYOUT
AREAS	Number	[0..1], areas.LAYOUT

PATHS	Number	[0..1], paths.LAYOUT
RESOURCE- OBJECTS	Number	[0..1], resource-objects.LAYOUT
PART-OBJECTS	Number	[0..1], part-objects.LAYOUT

Table level-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
LEVELS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]

Table level-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SKILL-MULTI-KEY	Number	[1], system use
level-definition- identifier	Number	[1]
level-definition- number	Text	[1]

Table levels

Fields	Data Type	Description
INDEX	Number	[1], system use
SKILL-DEFINITION	Number	[1], system use
minimum-level- number	Number /Integer	[1]
maximum-level- number	Number /Integer	[1]
LEVEL-DEFINITION	Number	[1..*], level-definition.LEVELS

Table locations-served-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE	Number	[1], system use
STATION-KEY	Number	[0..*], station-key.LOCATIONS-SERVED-KEYS
MACHINE-KEY	Number	[0..*], machine-key.LOCATIONS-SERVED-KEYS

Table logical-or

Fields	Data Type	Description
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INDEX	Number	[1], system use
LOGICAL-STRUCTURE	Number	[1], system use
a-key	Text	[1]

Table logical-structure

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-COMPONENTS	Number	[1], system use
logical-and	Text	[0..1]
a-key	Text	[0..1]
LOGICAL-OR	Text	[0..1], logical-or.LOGICAL-STRUCTURE
SET-LOGICAL-CLAUSE	Text	[0..1], set-logical-clause.LOGICAL-STRUCTURE
USE-LOGICAL-CLAUSE	Text	[0..*], use-logical-clause.LOGICAL-STRUCTURE
A-WEIGHTED-ELEMENT	Text	[0..1], a-weighted-element.LOGICAL-STRUCTURE

Table machine

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
hourly-rate	Number /Double (Fixed)	[0..1]
STATION-KEYS	Number	[0..1], station-keys.MACHINE
RELIABILITY-STATISTICS	Number	[0..1], reliability-statistics.MACHINE
MACHINE-SPECIFICATIONS	Number	[0..1], machine-specifications.MACHINE
MACHINE-STATUS	Number	[0..1], machine-status.MACHINE

Table machine-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES-ASSIGNED	Number	[1], system use
MACHINE-KEY	Number	[0..1], machine-key.MACHINE-ASSIGNED

MACHINE-GROUP-KEY	Number	[0..1], machine-group-key.MACHINE-ASSIGNED
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.MACHINE-ASSIGNED
EVENTS	Number	[0..1], events.MACHINE-ASSIGNED

Table machine-configuration

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES-REQUIRED	Number	[1], system use
minimum-machines	Number /Integer	[1]
maximum-machines	Number /Integer	[1]
MACHINE-KEYS	Number	[1], machine-keys.MACHINE-CONFIGURATION
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.MACHINE-CONFIGURATION

Table machine-group

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
hourly-rate	Number /Double (Fixed)	[0..1]
MACHINE-KEYS	Number	[0..1], machine-keys.MACHINE-GROUP
STATION-KEYS	Number	[0..1], station-keys.MACHINE-GROUP
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.MACHINE-GROUP

Table machine-group-key

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-KEYS	Number	[1], system use
MACHINE-ASSIGNED	Number	[1], system use
machine-group-identifier	Number	[1]

machine-group-number	Text	[1]
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Table machine-key

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-KEYS	Number	[1], system use
MACHINE-ASSIGNED	Number	[1], system use
MACHINE-USED	Number	[1], system use
MAINTAINED-RESOURCE-KEYS	Number	[1], system use
LOCATIONS-SERVED-KEYS	Number	[1], system use
SETUP-RESOURCES-KEYS	Number	[1], system use
MACHINE-SCHEDULE	Number	[1], system use
machine-identifier	Number	[1]
machine-number	Text	[1]

Table machine-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-CONFIGURATION	Number	[1], system use
MACHINE-GROUP	Number	[1], system use
STATION	Number	[1], system use
TARGET-MACHINES	Number	[1], system use
MACHINE-KEY	Number	[0..*], machine-key.MACHINE-KEYS
MACHINE-GROUP-KEY	Number	[0..*], machine-group-key.MACHINE-KEYS

Table machine-program

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-PROGRAMS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE

REVISIONS	Text	[0..1], revisions.SOURCE
BATCH-SIZES	Number	[1], batch-sizes.MACHINE-PROGRAM
ESTIMATED-DURATIONS	Number	[0..1], estimated-durations.MACHINE-PROGRAM
TARGET-MACHINES	Number	[0..1], target-machines.MACHINE-PROGRAM

Table machine-program-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN-MULTI-KEY	Number	[1], system use
machine-program-identifier	Number	[1]
machine-program-number	Text	[1]

Table machine-programs

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN	Number	[1], system use
MACHINE-PROGRAM	Number	[1..*], machine-program.MACHINE-PROGRAMS

Table machine-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES-SECTION	Number	[1], system use
MACHINE-KEY	Number	[1], machine-key.MACHINE-SCHEDULE
WORK-ASSIGNMENTS	Number	[1], work-assignemnts.MACHINE-SCHEDULE

Table machine-specifications

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE	Number	[1], system use
manufacturer	Text	[0..1]
model-number	Text	[1]
serial-number	Text	[0..1]
machine-description	Text	[0..1]
horsepower	Number /Double	[0..1]
controller-type	Enumeration	[0..1]
efficiency-rating	Text	[0..1]

workpiece-capacity	Number /Double	[0..1]
PART-KEY	Number	[0..1], part-key.MACHINE-SPECIFICATIONS

Table machine-status

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE	Number	[1], system use
operational-state	Enumeration	[0..1]
maintenance-state	Enumeration	[0..1]
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.MACHINE-STATUS
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.MACHINE-STATUS

Table machine-used

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINES-USED	Number	[1], system use
MACHINE-KEY	Number	[1], machine-key.MACHINE-USED
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.MACHINE-USED
EVENTS	Number	[0..1], events.MACHINE-USED

Table machines

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
MACHINE	Number	[1..*], machine.MACHINES
MACHINE-GROUP	Number	[0..*], machine.group.MACHINES

Table machines-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-ASSIGNED	Number	[1], system use
number-of-machines	Number	[1]

	/Integer	
MACHINE-ASSIGNED	Number	[1..*], machine-assigned.MACHINES-ASSIGNED

Table machines-required

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-REQUIRED	Number	[1], system use
MACHINE-CONFIGURATION	Number	[1..*], machine-configuration.MACHINES-REQUIRED

Table machines-section

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-SECTION	Number	[1], system use
MACHINE-SCHEDULE	Number	[1..*], machine-schedule.MACHINES-SECTION

Table machines-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
number-of-machines	Number /Integer	[1]
MACHINE-USED	Number	[1..*], machine-used.MACHINES-USED

Table mail

Fields	Data Type	Description
INDEX	Number	[1], system use
ADDRESS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
name	Text	[0..1]
street-address1	Text	[1]
street-address2	Text	[0..1]
city	Text	[1]
state	Text	[1]
country	Text	[0..1]
postal-code	Text	[0..1]

Table maintained-resource-keys

Fields	Data Type	Description
INDEX	Number	[1], system use

MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
MAINTENANCE-DEFINITION	Number	[1], system use
MACHINE-KEY	Number	[0..*], machine-key.MAINTAINED-RESOURCE-KEYS
CRANE-KEY	Number	[0..*], crane-key.MAINTAINED-RESOURCE-KEYS
STATION-KEY	Number	[0..*], station-key.MAINTAINED-RESOURCE-KEYS

Table maintenance-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-DEFINITIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
periodicity	Number /Double (Fixed)	[1], hh:mm:ss
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PLAN-DEFINITION	Number	[0..1], plan-definition.MAINTENANCE-DEFINITION
ESTIMATED-DURATIONS	Number	[0..1], estimated-durations.MAINTENANCE-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.MAINTENANCE-DEFINITION
MAINTAINED-RESOURCE-KEYS	Number	[1], maintained-resource-keys.MAINTENANCE-DEFINITION

Table maintenance-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
maintenance-definition-identifier	Number	[1]
maintenance-	Text	[1]

definition-number		
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Table maintenance-definitions

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
MAINTENANCE-DEFINITION	Number	[1..*], maintenance-definition.MAINTENANCE-DEFINITIONS

Table maintenance-order

Fields	Data Type	Description
INDEX	Number	[1], system use
TASKS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
MAINTENANCE-ORDER-DEFINITION	Number	[0..1], maintenance-order-definition.MAINTENANCE-ORDER
MAINTENANCE-ORDER-STATUS	Number	[0..1], maintenance-order-status.MAINTENANCE-ORDER

Table maintenance-order-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-ORDER	Number	[1], system use
CUSTOMERS	Number	[0..1], customers.MAINTENANCE-ORDER-DEFINITION
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.MAINTENANCE-ORDER-DEFINITION
MAINTAINED-RESOURCE-KEYS	Number	[1], maintained-resource-keys.MAINTENANCE-ORDER-DEFINITION

MAINTENANCE-RESOURCE-KEYS	Number	[1], maintenance-resource-keys.MAINTENANCE-ORDER-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.MAINTENANCE-ORDER-DEFINITION
CHILD-WORK-ITEMS	Number	[0..1], child-work-items.MAINTENANCE-ORDER-DEFINITION
PRECEDENT-CONSTRAINTS	Number	[0..1], precedent-constraints.MAINTENANCE-ORDER-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary. MAINTENANCE-ORDER-DEFINITION

Table maintenance-order-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
MAINTENANCE-ORDER-SCHEDULE	Number	[1], system use
maintenance-order-identifier	Number	[1]
maintenance-order-number	Text	[1]

Table maintenance-order-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-ORDERS-SECTION	Number	[1], system use
MAINTENANCE-ORDER-KEY	Number	[1], maintenance-order.key.MAINTENANCE-ORDER-SCHEDULE
RESOURCES-ASSIGNED	Number	[1], resources-assigned.MAINTENANCE-ORDER-SCHEDULE

Table maintenance-order-status

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-ORDER	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress. MAINTENANCE-ORDER-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress. MAINTENANCE-ORDER-STATUS

Table maintenance-orders

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
MAINTENANCE-ORDER	Number	[1..*], maintenance-order.MAINTENANCE-ORDERS

Table maintenance-orders-section

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use
MAINTENANCE-ORDER-SCHEDULE	Number	[1..*], maintenance-order-schedule.MAINTENANCE-ORDERS-SECTION

Table material-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
MATERIAL-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code.MATERIAL-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.MATERIAL-INSTANCE
DIMENSIONS	Number	[0..1], dimensions.MATERIAL-INSTANCE

Table material-instances

Fields	Data Type	Description
INDEX	Number	[1], system use
MATERIALS-INVENTORY-ITEM	Number	[1], system use
MATERIAL-INSTANCE	Number	[1..*], material-instance.MATERIAL-INSTANCES

Table materials-inventory

Fields	Data Type	Description
INDEX	Number	[1], system use
INVENTORY	Number	[1], system use
MATERIALS-INVENTORY-ITEM	Number	[1..*], materials-inventory-item.MATERIALS-INVENTORY

Table materials-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
MATERIALS-INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART-KEY	Number	[0..1], part-key.MATERIALS-INVENTORY-ITEM
material-type	Enumeration	[1]
STOCK-LEVEL-QUANTITIES	Number	[1], stock-level-quantities.MATERIALS-INVENTORY-ITEM
PROCUREMENT-MULTI-KEYS	Number	[0..1], procurement-multi-keys.MATERIALS-INVENTORY-ITEM
MATERIALS-INSTANCES	Number	[0..1], materials-instances.MATERIALS-INVENTORY-ITEM

Table mean-time-between-failures

Fields	Data Type	Description
INDEX	Number	[1], system use
RELIABILITY-STATISTICS	Number	[1], system use
nominal-duration	Number /Double (Fixed)	[0..1]
DURATION-DISTRIBUTIONS	Number	[0..1], duration-distributions.MEAN-TIME-BETWEEN-FAILURES

Table mean-time-to-repair

Fields	Data Type	Description
INDEX	Number	[1], system use
RELIABILITY-STATISTICS	Number	[1], system use
nominal-duration	Number	[0..1]

	/Double (Fixed)	
DURATION-DISTRIBUTIONS	Number	[0..1], duration-distributions.MEAN-TIME-TO-REPAIR

Table new-setup

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-CHANGEOVER	Number	[1], system use
SETUP-DEFINITION-KEY	Number	[1], setup-definition-key.NEW-SETUP
ESTIMATED-DURATIONS	Number	[0..1], estimated-durations.NEW-SETUP

Table object-boundary

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCE-OBJECT	Number	[1], system use
PART-OBJECT	Number	[1], system use
BOUNDARY-ELEMENT	Number	[1..*], boundary-element.OBJECT-BOUNDARY

Table operation-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
OPERATION-DEFINITIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
operation-type	Enumeration	[1]
operation-subtype	Enumeration	[0..1]
description	Text	[0..1]
STATION-KEYS	Text	[0..1], station-keys.OPERATION-DEFINITION

Table operation-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PLAN-STEP	Number	[1], system use
operation-definition-identifier	Number	[1]
operation-definition-	Text	[1]

number		
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Table operation-definitions

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
OPERATION-DEFINITION	Number	[1..*], operation-definition.OPERATION-DEFINITIONS

Table operation-sheet

Fields	Data Type	Description
INDEX	Number	[1], system use
OPERATION-SHEETS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
BATCH-SIZES	Number	[1], batch-sizes.OPERATION-SHEET
PLAN-DEFINITION	Number	[1], plan-definition.OPERATION-SHEET

Table operation-sheet-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN-MULTI-KEY	Number	[1], system use
operation-sheet-identifier	Number	[1]
operation-sheet-number	Text	[1]

Table operation-sheets

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN	Number	[1], system use

OPERATION-SHEET	Number	[1..*], operation-sheet-OPERATION-SHEETS
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Table order

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDERS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORDER-DEFINITION	Number	[0..1], order-definition.ORDER
ORDER-STATUS	Number	[0..1], order-status.ORDER

Table order-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER	Number	[1], system use
priority-rating	Enumeration	[0..1]
CUSTOMERS	Number	[1], customers.ORDER-DEFINITION
DUE-DATES	Number	[1], due-dates.ORDER-DEFINITION
ORDER-ITEMS	Number	[0..1], order-items.ORDER-DEFINITION
PRECEDENT-CONSTRAINTS	Number	[0..1], precedent-constraints.ORDER-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.ORDER-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.ORDER-DEFINITION

Table order-item

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEMS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
ORDER-ITEM-DEFINITION	Number	[0..1], order-item-definition.ORDER-ITEM
ORDER-ITEM-STATUS	Number	[0..1], order-item-status.ORDER-ITEM

Table order-item-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM	Number	[1], system use
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.ORDER-ITEM-DEFINITION
PART-QUANTITIES	Number	[1], part-quantities.ORDER-ITEM-DEFINITION
CHILD-WORK-ITEMS	Number	[0..1], child-work-items.ORDER-ITEM-DEFINITION
PRECEDENT-CONSTRAINTS	Number	[0..1], precedent-constraints.ORDER-ITEM-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.ORDER-ITEM-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.ORDER-ITEM-DEFINITION

Table order-item-key

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-MULTI-KEY	Number	[1], system use
order-item-identifier	Number	[1]
order-item-number	Text	[1]

Table order-item-status

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.ORDER-ITEM-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.ORDER-ITEM-STATUS

Table order-items

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-DEFINITION	Number	[1], system use
ORDER-ITEM	Number	[1..*], order-item.ORDER-ITEMS

Table order-key

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-MULTI-KEY	Number	[1], system use

order-identifier	Number	[1]
order-number	Text	[1]

Table order-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
ORDER-SCHEDULE	Number	[1], system use
ORDER-KEY	Number	[0..1], order-key.ORDER-MULTI-KEY
ORDER-ITEM-KEY	Number	[0..1], order-item-key.ORDER-MULTI-KEY

Table order-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDERS-SECTION	Number	[1], system use
ORDER-MULTI-KEY	Number	[1], order-multi.key.ORDER-SCHEDULE
RESOURCES-ASSIGNED	Number	[1], resources-assigned.ORDER-SCHEDULE

Table order-status

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.ORDER-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress..ORDER-STATUS

Table orders

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORDER	Number	[1..*], order.ORDER

Table orders-section

Fields	Data Type	Description
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INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use
ORDER-SCHEDULE	Number	[1..*], order-schedule.ORDER S-SECTION

Table organization

Fields	Data Type	Description
INDEX	Number	[1], system use
ORGANIZATIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
priority-rating	Enumeration	[0..1]
CONTACTS	Number	[0..1], contacts.ORGANIZATION
ADDRESSES	Number	[0..1], addresses.ORGANIZATION
DEPARTMENTS	Number	[1..*], departments.ORGANIZATION
POSITION-DESCRIPTORS	Number	[0..1], position-descriptors.ORGANIZATION

Table organization-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CREATOR	Number	[1], system use
ORGANIZATIONAL-CONTACT	Number	[1], system use
POSITION-MULTI-KEY	Number	[1], system use
CHILD-DEPARTMENT-MULTI-KEY	Number	[1], system use
organization-identifier	Number	[1]
organization-number	Text	[1]

Table organizational-contact

Fields	Data Type	Description
INDEX	Number	[1], system use
CUSTOMERS	Number	[1], system use
SUPPLIERS	Number	[1], system use
ORGANIZATION-KEY	Number	[1], organization-key.ORGANIZATIONAL-CONTACT
DEPARTMENT-KEY	Number	[0..1], department-key.ORGANIZATIONAL-CONTACT

CONTACT-KEY	Number	[1], contact.key.ORGANIZATIONAL-CONTACT
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Table organizations

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORGANIZATION	Number	[1..*], organization.ORGANIZATIONS

Table paper-document

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCE	Number	[1], system use
REPOSITORY	Number	[1..*], repository.PAPER-DOCUMENT

Table parameter

Fields	Data Type	Description
INDEX	Number	[1], system use
PARAMETERS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
value	Number /Double	[0..1]
default	Number /Double	[0..1]

Table parameters

Fields	Data Type	Description
INDEX	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
PLAN-STEP	Number	[1], system use
PLAN-DEFINITION	Number	[1], system use
PARAMETER	Number	[1..*], parameter.PARAMETERS

Table parent-setup-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DEFINITION	Number	[1], system use
SETUP-DEFINITION-KEY	Number	[1..*], setup-definition-key.PARENT-SETUP-KEYS

Table part

Fields	Data Type	Description
INDEX	Number	[1], system use
PARTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
CUSTOMERS	Number	[0..1], customers.PART
SUPPLIERS	Number	[0..1], suppliers.PART
BILL-OF-MATERIALS-KEY	Number	[0..1], bill-of-materials-key.PART
PROCESS-PLAN-MULTI-KEYS	Number	[0..1], process-plan-multi-keys.PART
PART-SPECIFICATIONS	Number	[0..1], part-specifications.PART
GROUP-TECHNOLOGY-CODE	Number	[0..1], group-technology-code.PART

Table part-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code.PART-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.PART-INSTANCE
COMPONENT-PART-MULTI-KEYS	Number	[0..1], component-part-multi-keys.PART-INSTANCE

Table part-instance-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PARTS-ASSIGNED	Number	[1], system use
PARTS-USED	Number	[1], system use
COMPONENT-PART-MULTI-KEY	Number	[1], system use
part-instance-identifier	Number	[1]
part-instance-number	Text	[1]

Table part-instances

Fields	Data Type	Description
INDEX	Number /Integer	[1], system use
PART-INVENTORY-ITEM	Number	[1], system use
PART-INSTANCE	Number	[1..*], part-instance.PART-INSTANCES

Table part-inventory

Fields	Data Type	Description
INDEX	Number	[1], system use
INVENTORY	Number	[1], system use
PART-INVENTORY-ITEM	Number	[1..*], part-inventory-item.PART-INVENTORY

Table part-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART-KEY	Number	[1], part-key.PART-INVENTORY-ITEM
STOCK-LEVEL-QUANTITIES	Number	[1], stock-level-quantities.PART-INVENTORY-ITEM
PROCUREMENT-MULTI-KEYS	Number	[0..1], procurement-multi-keys.PART-INVENTORY-ITEM
PART-INSTANCES	Number	[0..1], part-instances.PART-INVENTORY-ITEM

Table part-inventory-item-key

Fields	Data Type	Description
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INDEX	Number	[1], system use
COMPONENT-PART-MULTI-KEY	Number	[1], system use
part-inventory-item-identifier	Number	[1]
part-inventory-item-number	Text	[1]

Table part-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-QUANTITY	Number	[1], system use
MACHINE-SPECIFICATIONS	Number	[1], system use
TOOL-DEFINITION	Number	[1], system use
FIXTURE-DEFINITION	Number	[1], system use
PART-OBJECT	Number	[1], system use
BILL-OF-MATERIALS	Number	[1], system use
PART-INVENTORY-ITEM	Number	[1], system use
COMPONENT-PART-MULTI-KEY	Number	[1], system use
MATERIALS-INVENTORY-ITEM	Number	[1], system use
PROCURED-PART	Number	[1], system use
BATCH-SIZE	Number	[1], system use
part-identifier	Number	[1]
part-number	Text	[1]

Table part-object

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-OBJECTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
PART-KEY	Number	[1], part-key.PART-OBJECT
FROM-REFERENCE-FRAME	Number	[0..1], from-reference-frame.PART-OBJECT
behavior	Enumeration	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
OBJECT-	Number	[1..*], object-boundary.PART-OBJECT

BOUNDARY		
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Table part-objects

Fields	Data Type	Description
INDEX	Number	[1], system use
LAYOUT	Number	[1], system use
PART-OBJECT	Number	[1..*], part-object.PART-OBJECTS

Table part-quantities

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use
PARTS-REQUIRED	Number	[1], system use
PARTS-COMPLETED	Number	[1], system use
PARTS-ASSIGNED	Number	[1], system use
PARTS-USED	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
PICK-ORDER-ITEM-DEFINITION	Number	[1], system use
BOM-ELEMENT	Number	[1], system use
PART-QUANTITY	Number	[1..*], part-quantity.PART-QUANTITIES

Table part-quantity

Fields	Data Type	Description
INDEX	Number	[1], system use
PART-QUANTITIES	Number	[1], system use
quantity	Number	[1]
PART-KEY	Number	[1], part-key.PART-QUANTITY

Table part-specifications

Fields	Data Type	Description
INDEX	Number	[1], system use
PART	Number	[1], system use
length	Number /Double	[0..1]
width	Number /Double	[0..1]
weight	Number /Double	[0..1]
unit-of-issue	Number /Integer	[0..1]
unit-cost	Number	[0..1]

	/Double (Fixed)	
unit-price	Number /Double (Fixed)	[0..1]
manufacturing-lead-time	Number /Double (Fixed)	[0..1], hh:mm:ss
special-handling-requirements	Text	[0..1]

Table parts

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART	Number	[1..*], part.PARTS

Table parts-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-ASSIGNED	Number	[1], system use
PART-QUANTITIES	Number	[1], part-quantities.PARTS-ASSIGNED
PART-INSTANCE-KEY	Number	[0..*], plan-instance-key.PARTS-ASSIGNED

Table parts-completed

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-ACTUAL-PROGRESS	Number	[1], system use
PART-QUANTITIES	Number	[1], part-quantities.PART-COMPLETED

Table parts-required

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-REQUIRED	Number	[1], system use

PART-QUANTITIES	Number	[1], part-quantities.PARTS-REQUIRED
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Table parts-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
PART-QUANTITIES	Number	[1], part-quantities.PARTS-USED
PART-INSTANCE-KEY	Number	[0..*], part-instance-key.PARTS-USED

Table path

Fields	Data Type	Description
INDEX	Number	[1], system use
PATHS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
FROM-REFERENCE-FRAME	Number	[0..1], from-reference-frame.PATH
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
PATH-ROUTE	Number	[1..*], path-route.PATH

Table path-route

Fields	Data Type	Description
INDEX	Number	[1], system use
PATH	Number	[1], system use
BOUNDARY-ELEMENT	Number	[1..*], boundary-element.PATH-ROUTE

Table paths

Fields	Data Type	Description
INDEX	Number	[1], system use
LAYOUT	Number	[1], system use
PATH	Number	[1..*], path.PATHS

Table pay-status

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-STATUS	Number	[1], system use
employment-status	Enumeration	[1]
salary-type	Enumeration	[0..1]
hourly-rate	Number /Double	[0..1]

	(Fixed)	
overtime-eligibility	Enumeration	[0..1]
overtime-hours-threshold	Number /Double (Fixed)	[0..1]
overtime-rate	Number /Double (Fixed)	[0..1]
annual-absentee-rate	Number /Double (Fixed)	[0..1]
ANNUAL-LEAVE-ACCRUAL-RATE	Number	[0..1], annual-leave-accrual-rate.PAY-STATUS
SICK-LEAVE-ACCRUAL-RATE	Number	[0..1], sick-leave-accrual-rate.PAY-STATUS

Table phone

Fields	Data Type	Description
INDEX	Number	[1], system use
ADDRESS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]

Table pick-order

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDERS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PICK-ORDER-DEFINITION	Number	[0..1], pick-order-definition.PICK-ORDER
PICK-ORDER-STATUS	Number	[0..1], pick-order-status.PICK-ORDER

Table pick-order-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER	Number	[1], system use
CUSTOMERS	Number	[0..1], customers.PICK-ORDER-DEFINITION

WORK-KEYS	Number	[0..1], work-keys.PICK-ORDER-DEFINITION
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.PICK-ORDER-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.PICK-ORDER-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.PICK-ORDER-DEFINITION
PICK-ORDER-ITEMS	Number	[0..1], pick-order-items.PICK-ORDER-DEFINITION

Table pick-order-item

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER-ITEMS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
PICK-ORDER-ITEM-DEFINITION	Number	[0..1], pick-order-item-definition.PICK-ORDER-ITEM
PICK-ORDER-ITEM-STATUS	Number	[0..1], pick-order-item-status.PICK-ORDER-ITEM

Table pick-order-item-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER-ITEM	Number	[1], system use
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[0..1], due-dates.PICK-ORDER-ITEM-DEFINITION
PART-QUANTITIES	Number	[1], part-quantities.PICK-ORDER-ITEM-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.PICK-ORDER-DEFINITION

Table pick-order-item-status

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER-ITEM	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.PICK-ORDER-ITEM-STATUS

WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.PICK-ORDER-ITEM-STATUS
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Table pick-order-items

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-ITEM	Number	[1..*], pick-order-item.PICK-ORDER-ITEMS

Table pick-order-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
PICK-ORDER-SCHEDULE	Number	[1], system use
pick-order-identifier	Number	[1]
pick-order-number	Text	[1]

Table pick-order-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDERS-SECTION	Number	[1], system use
PICK-ORDER-KEY	Number	[1], pick-order.key.PICK-ORDER-SCHEDULE
RESOURCES-ASSIGNED	Number	[1], resources-assigned.PICK-ORDER-SCHEDULE

Table pick-order-status

Fields	Data Type	Description
INDEX	Number	[1], system use
PICK-ORDER	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.PICK-ORDER-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.PICK-ORDER-STATUS

Table pick-orders

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]

number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PICK-ORDER	Number	[1..*], pick-order.PICK-ORDERS

Table pick-orders-section

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use
PICK-ORDER-SCHEDULE	Number	[1..*], pick-order-schedule.PICK-ORDERS-SECTION

Table plan-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
MAINTENANCE-DEFINITION	Number	[1], system use
ROUTING-SHEET	Number	[1], system use
OPERATION-SHEET	Number	[1], system use
PARAMETERS	Number	[1], parameters.PLAN-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.PLAN-DEFINITION
ESTIMATED-DURATIONS	Number	[0..1], estimated-durations.PLAN-DEFINITION
PLAN-STEPS	Number	[0..1], plan-steps.PLAN-DEFINITION
STEP-PRECEDENT-CONSTRAINTS	Number	[0..1], step-precedent-constraints.PLAN-DEFINITION

Table plan-step

Fields	Data Type	Description
INDEX	Number	[1], system use
PLAN-STEPS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
repetition-count	Number /Integer	[0..1]
OPERATION-DEFINITION-KEY	Number	[1], operation-definition-key.PLAN-STEP
specific-instructions	Text	[0..1]
ESTIMATED-	Number	[0..1], estimated-durations.PLAN-STEP

DURATIONS		
PARAMETERS	Number	[0..1], parameters.PLAN-STEP
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
RESOURCES-REQUIRED	Number	[0..1], resources-required.PLAN-STEP

Table plan-step-key

Fields	Data Type	Description
INDEX	Number	[1], system use
STEP-PRECEDENT-CONSTRAINT	Number	[1], system use
plan-step-identifier	Number	[1]
plan-step-number	Text	[1]

Table plan-steps

Fields	Data Type	Description
INDEX	Number	[1], system use
PLAN-DEFINITION	Number	[1], system use
PLAN-STEP	Number	[1..*], plan-step.PLAN-STEPS

Table planned-costs

Fields	Data Type	Description
INDEX	Number	[1], system use
COST-SUMMARY	Number	[1], system use
COST-CATEGORIES	Number	[1], cost-categories.PLANNED-COSTS

Table position

Fields	Data Type	Description
INDEX	Number	[1], system use
POSITIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
hourly-rate	Number /Double (Fixed)	[0..1]
ADDRESSES	Number	[0..1], addresses.POSITION
POSITION-DESCRIPTION-KEY	Number	[0..1], position-description-key.POSITION
number-of-positions	Number /Integer	[0..1]
EMPLOYEE-KEYS	Number	[0..1], employee-keys.POSITION

Table position-description

Fields	Data Type	Description
INDEX	Number	[1], system use
POSITION-DESCRIPTIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]

Table position-description-key

Fields	Data Type	Description
INDEX	Number	[1], system use
POSITION	Number	[1], system use
position-description-identifier	Number	[1]
position-description-number	Text	[1]

Table position-descriptions

Fields	Data Type	Description
INDEX	Number	[1], system use
ORGANIZATION	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
POSITION-DESCRIPTION	Number	[1..*], position-description.POSITION-DESCRIPTIONS

Table position-key

Fields	Data Type	Description
INDEX	Number	[1], system use
POSITION-MULTI-KEY	Number	[1], system use
position-identifier	Number	[1]
position-number	Text	[1]

Table position-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use

POSITION-MULTI-KEYS	Number	[1], system use
ORGANIZATION-KEY	Number	[0..1], organization-key.POSITION-MULTI-KEY
DEPARTMENT-KEY	Number	[0..1], department-key.POSITION-MULTI-KEY
POSITION-KEY	Number	[1], position-key.POSITION-MULTI-KEY

Table position-multi-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE	Number	[1], system use
POSITION-MULTI-KEY	Number	[1..*], position-multi-key.POSITION-MULTI-KEYS

Table positions

Fields	Data Type	Description
INDEX	Number	[1], system use
DEPARTMENT	Number	[1], system use
POSITION	Number	[1..*], position.POSITIONS

Table precedent-constraint

Fields	Data Type	Description
INDEX	Number	[1], system use
PRECEDENT-CONSTRAINTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
logical-relationship	Enumeration	[0..1]
lag-percentage	Number /Double	[0..1]
lag-duration	Number /Double (Fixed)	[0..1]
WORK-ITEM	Number	[1], work-item.PREDEDENT-CONSTRAINT
PRECEDENT-WORK-ITEM	Number	[1..*], precedent-work-item.PREDEDENT-CONSTRAINT

Table precedent-constraints

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use

ORDER-DEFINITION	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
PRECEDENT-CONSTRAINT	Number	[1..*], precedent-constraint.PRECEDENT-CONSTRAINTS

Table precedent-plan-step-key

Fields	Data Type	Description
INDEX	Number	[1], system use
STEP-PRECEDENT-CONSTRAINT	Number	[1], system use
precedent-plan-step-identifier	Number	[1]
precedent-plan-step-number	Text	[1]

Table precedent-work-item

Fields	Data Type	Description
INDEX	Number	[1], system use
PRECEDENT-CONSTRAINT	Number	[1], system use
WORK-KEYS	Number	[1], work-keys.PRECEDENT-WORK-ITEM

Table probability-distribution

Fields	Data Type	Description
INDEX	Number	[1], system use
DURATION-DISTRIBUTIONS	Number	[1], system use
PROBABILTY-DISTRIBUTION-SET	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
value1	Number /Double (Fixed)	[1]
value2	Number /Double (Fixed)	[1]

value3	Number /Double (Fixed)	[1]
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Table probability-distribution-key

Fields	Data Type	Description
INDEX	Number	[1], system use
DURATION-DISTRIBUTIONS	Number	[1], system use
probability-distribution-identifier	Number	[1]
probability-distribution-number	Text	[1]

Table probability-distribution-set

Fields	Data Type	Description
INDEX	Number	[1], system use
PROBABILITY-DISTRIBUTIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PROBABILITY-DISTRIBUTION	Number	[1..*], probability-distribution.PROBABILITY-DISTRIBUTION-SET

Table probability-distributions

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PROBABILITY-DISTRIBUTION-SET	Number	[1..*], probability-distribution-set.PROBABILITY-DISTRIBUTIONS

Table process-plan

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLANS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
BATCH-SIZES	Number	[1], batch-sizes.PROCESS-PLAN
ROUTING-SHEETS	Number	[0..1], routing-sheets.PROCESS-PLAN
OPERATION-SHEETS	Number	[0..1], operation-sheets.PROCESS-PLAN
MACHINE-PROGRAMS	Number	[0..1], machine-programs.PROCESS-PLAN

Table process-plan-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN-MULTI-KEY	Number	[1], system use
process-plan-identifier	Number	[1]
process-plan-number	Text	[1]

Table process-plan-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
PROCESS-PLAN-MULTI-KEYS	Number	[1], system use
PROCESS-PLAN-KEY	Number	[0..1], process-plan-key.PROCESS-PLAN-MULTI-KEY
ROUTING-SHEET-KEY	Number	[0..1], routing-sheet-key.PROCESS-PLAN-MULTI-KEY
OPERATION-SHEET-KEY	Number	[0..1], operation-sheet-key.PROCESS-PLAN-MULTI-KEY
MACHINE-PROGRAM-KEY	Number	[0..1], machine-program-key.PROCESS-PLAN-MULTI-KEY

Table process-plan-multi-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
PART	Number	[1], system use

PROCESS-PLAN-MULTI-KEY	Number	[1..*], process-plan-multi-key.PROCESS-PLAN-MULTI-KEYS
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Table process-plans

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PROCESS-PLAN	Number	[1..*], process-plan.PROCESS-PLANS

Table procured-part

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-ITEM-DEFINITION	Number	[1], system use
PART-KEY	Number	[1], part-key.PROCURED-PART
quantity	Number Integer	[1]
unit-cost	Number /Double (Fixed)	[0..1]
total-cost	Number /Double (Fixed)	[0..1]

Table procurement

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PROCUREMENT-DEFINITION	Number	[0..1], procurement-definition.PROCUREMENT
PROCUREMENT-	Number	[0..1], procurement-status.PROCUREMENT

STATUS		
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Table procurement-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT	Number	[1], system use
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.PROCUREMENT-DEFINITION
SUPPLIERS	Number	[0..1], suppliers.PROCUREMENT-DEFINITION
PROCUREMENT-ITEMS	Number	[1], procurement-items.PROCUREMENT-DEFINITION

Table procurement-item

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-ITEMS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
PROCUREMENT-ITEM-DEFINITION	Number	[0..1], procurement-item-definition.PROCUREMENT-ITEM
PROCUREMENT-ITEM-STATUS	Number	[0..1], procurement-item-status.PROCUREMENT-ITEM

Table procurement-item-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-ITEM	Number	[1], system use
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.PROCUREMENT-ITEM-DEFINITION
WORK-KEYS	Number	[0..1], work-keys.PROCUREMENT-ITEM-DEFINITION
PROCURED-PART	Number	[1..*], procured-part.PROCUREMENT-ITEM-DEFINITION

Table procurement-item-key

Fields	Data Type	Description
INDEX	Number	[1], system use

PROCUREMENT-MULTI-KEY	Number	[1], system use
procurement-item-identifier	Number	[1]
procurement-item-number	text	[1]

Table procurement-item-status

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-ITEM	Number	[1], system use
STATUS-CODE	Number	[1], status-code. PROCUREMENT-ITEM-STATUS
EVENTS	Number	[0..1], events.PROCUREMENT-ITEM-STATUS

Table procurement-items

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-DEFINITION	Number	[1], system use
PROCUREMENT-ITEM	Number	[1..*], procurement-item.PROCUREMENT-ITEMS

Table procurement-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-MULTI-KEY	Number	[1], system use
procurement-identifier	Number	[1]
procurement-number	text	[1]

Table procurement-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT-MULTI-KEYS	Number	[1], system use
WORK-KEYS	Number	[1], system use
PROCUREMENT-KEY	Number	[0..1], procurement-key.PROCUREMENT-MULTI-KEY
PROCUREMENT-ITEM-KEY	Number	[0..1], procurement-item-key.PROCUREMENT-MULTI-KEY

Table procurement-multi-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INVENTORY-ITEM	Number	[1], system use
TOOLSET-INVENTORY-ITEM	Number	[1], system use
FIXTURE-INVENTORY-ITEM	Number	[1], system use
FIXTURESET-INVENTORY-ITEM	Number	[1], system use
PART-INVENTORY-ITEM	Number	[1], system use
MATERIALS-INVENTORY-ITEM	Number	[1], system use
PROCUREMENT-MULTI-KEY	Number	[1..*], procurement-multi-key.PROCUREMENT-MULTI-KEYS

Table procurement-status

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCUREMENT	Number	[1], system use
STATUS-CODE	Number	[1], status-code. PROCUREMENT-STATUS
EVENTS	Number	[0..1], events.PROCUREMENT-STATUS

Table procurements

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PROCUREMENT	Number	[1..*], procurement.PROCUREMENTS

Table reference

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]

description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
DIGITAL-FILES	Number	[0..1], digital-files.REFERENCE
PAPAER-DOCUMENT	Number	[0..1], paper-document.REFERENCE

Table reference-frame

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCE-FRAMES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
FROM-REFERENCE-FRAME	Number	[1], from-reference-frame.REFERENCE-FRAME

Table reference-frame-key

Fields	Data Type	Description
INDEX	Number	[1], system use
FROM-REFERENCE-FRAME	Number	[1], system use
reference-frame-identifier	Number	[1]
reference-frame-number	Text	[1]

Table reference-frames

Fields	Data Type	Description
INDEX	Number	[1], system use
LAYOUT	Number	[1], system use
REFERENCE-FRAME	Number	[1..*], reference-frame.REFERENCE-FRAMES

Table reference-key

Fields	Data Type	Description
INDEX	Number	[1], system use
REFERENCE-KEYS	Number	[1], system use
reference-identifier	Number	[1]
reference-number	Text	[1]

Table reference-keys

Fields	Data Type	Description
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INDEX	Number	[1], system use
SOURCE	Text	[1], system use
REFERENCE-KEY	Number	[1..*], refenece-key.REFERENCE-KEYS

Table references

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
REFERENCE	Number	[1..*], reference.REFERENCES

Table reliability-statistics

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE	Number	[1], system use
CRANE	Number	[1], system use
MEAN-TIME-BETWEEN-FAILURES	Number	[0..1], mean-time-between-failures.RELIABILITY-STATICTICS
MEAN-TIME-TO-REPAIR	Number	[0..1], mean-time-to-repair.RELIABILITY-STATICTICS

Table repository

Fields	Data Type	Description
INDEX	Number	[1], system use
PAPER-DOCUMENT	Number	[1], system use
reference-number	Text	[1]
storage-location	Text	[0..1]

Table resource-key

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCE-OBJECT	Number	[1], system use
resource-identifier	Number	[1]
resource-number	Text	[1]

Table resource-object

Fields	Data Type	Description
INDEX	Number	[1], system use

RESOURCE-OBJECTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
RESOURCE-KEY	Number	[1], resource-key.RESOURCE-OBJECT
FROM-REFERENCE-FRAME	Number	[0..1], from-reference-frame.RESOURCE-OBJECT
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
OBJECT-BOUNDARY	Number	[1..*], object-boundary.RESOURCE-OBJECT

Table resource-objects

Fields	Data Type	Description
INDEX	Number	[1], system use
LAYOUT	Number	[1], system use
RESOURCE-OBJECT	Number	[1..*], resource-object.RESOURCE-OBJECTS

Table resources

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
MACHINES	Number	[0..1], machines.RESOURCE
STATIONS	Number	[0..1], stations.RESOURCE
CRANES	Number	[0..1], cranes.RESOURCE
EMPLOYEES	Number	[0..1], employees.RESOURCE
TOOL-CATALOG	Number	[0..1], tool-catalog.RESOURCE
FIXTURE-CATALOG	Number	[0..1], fixture-catalog.RESOURCE

Table resources-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[1], system use
ORDER-SCHEDULE	Number	[1], system use

JOB-SCHEDULE	Number	[1], system use
TASK-SCHEDULE	Number	[1], system use
MAINTENANCE-ORDER-SCHEDULE	Number	[1], system use
PICK-ORDER-SCHEDULE	Number	[1], system use
TOOL-ORDER-SCHEDULE	Number	[1], system use
STATIONS-ASSIGNED	Number	[0..1], stations-assigned.RESOURCES-ASSIGNED
MACHINES-ASSIGNED	Number	[0..1], machines-assigned.RESOURCES-ASSIGNED
EMPLOYEES-ASSIGNED	Number	[0..*], employees-assigned.RESOURCES-ASSIGNED
CRANES-ASSIGNED	Number	[0..1], cranes-assigned.RESOURCES-ASSIGNED
PARTS-ASSIGNED	Number	[0..*], parts-assigned.RESOURCES-ASSIGNED

Table resources-required

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-ITEM-DEFINITION	Number	[1], system use
ORDER-DEFINITION	Number	[1], system use
JOB-DEFINITION	Number	[1], system use
TASK-DEFINITION	Number	[1], system use
MAINTENANCE-ORDER-DEFINITION	Number	[1], system use
PICK-ORDER-DEFINITION	Number	[1], system use
TOOL-ORDER-DEFINITION	Number	[1], system use
PLAN-DEFINITION	Number	[1], system use
PLAN-STEP	Number	[1], system use
STATIONS-REQUIRED	Number	[0..1], stations-required.RESOURCES-REQUIRED
MACHINES-REQUIRED	Number	[0..1], machines-required.RESOURCES-REQUIRED
EMPLOYEES-REQUIRED	Number	[0..1], employees-required.RESOURCES-REQUIRED
CRANS-REQUIRED	Number	[0..1], crans-required.RESOURCES-REQUIRED

PARTS-REQUIRED	Number	[0..1], parts-required.RESOURCES-REQUIRED
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Table resources-section

Fields	Data Type	Description
INDEX	Number	[1], system use
SCHEDULE	Number	[1], system use
STATIONS-SECTION	Number	[0..1], stations-section.RESOURCES-SECTION
MACHINES-SECTION	Number	[0..1], machines-section.RESOURCES-SECTION
CRANES-SECTION	Number	[0..1], cranes-section.RESOURCES-SECTION
EMPLOYEES-SECTION	Number	[0..1], employees-section.RESOURCES-SECTION

Table resources-used

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-ACTUAL-PROGRESS	Number	[1], system use
STATIONS-USED	Number	[0..1], stations-used.RESOURCES-USED
MACHINES-USED	Number	[0..1], machines-used.RESOURCES-USED
EMPLOYEES-USED	Number	[0..1], employees-used.RESOURCES-USED
CRANES-USED	Number	[0..1], cranes-used.RESOURCES-USED
PARTS-USED	Number	[0..*], parts-used.RESOURCES-USED

Table revision

Fields	Data Type	Description
INDEX	Number	[1], system use
REVISIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
date	Date/Time	[1], yyyy-mm-dd
description	Text	[0..1]
comment	Text	[0..1]
CREATORS	Number	[0..1], creators.REVISION

Table revisions

Fields	Data Type	Description
INDEX	Number	[1], system use
SOURCE	Text	[1], system use
REVISION	Number	[1..*], revision.REVISIONS

Table rotation

Fields	Data Type	Description
INDEX	Number	[1], system use
FROM-REFERENCE-FRAME	Number	[1], system use
alpha-coefficient	Number /Double	[1]
beta-coefficient	Number /Double	[1]
gamma-coefficient	Number /Double	[1]

Table routing-sheet

Fields	Data Type	Description
INDEX	Number	[1], system use
ROUTING-SHEETS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
BATCH-SIZES	Number	[1], batch-sizes.ROUTING-SHEET
PLAN-DEFINITION	Number	[1], plan-definition.ROUTING-SHEET

Table routing-sheet-key

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN-MULTI-KEY	Number	[1], system use
routing-sheet-identifier	Number	[1]
routing-sheet-number	Text	[1]

Table routing-sheets

Fields	Data Type	Description
INDEX	Number	[1], system use
PROCESS-PLAN	Number	[1], system use
ROUTING-SHEET	Number	[1..*], routing-sheet-ROUTING-SHEETS

Table scaling

Fields	Data Type	Description
INDEX	Number	[1], system use
FROM-REFERENCE-FRAME	Number	[1], system use

x-coefficient	Number /Double	[1]
y-coefficient	Number /Double	[1]
z-coefficient	Number /Double	[1]

Table schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
SCHEDULES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
RESOURCES-SECTION	Number	[0..1], resources-section.SCHEDULE
WORK-SECTION	Number	[0..1], work-section.SCHEDULE

Table schedules

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SCHEDULE	Number	[1..*], schedule.SCHEDULES

Table set-logical-clause

Fields	Data Type	Description
INDEX	Number	[1], system use
LOGICAL-STRUCTURE	Number	[1], system use
identifier	Number	[1]

Table setup-changeover

Fields	Data Type	Description
INDEX	Number	[1], system use

SETUP-CHANGEOVERS	Number	[1], system use
CURRENT-SETUP	Number	[1], current-setup.SETUP-CHANGEOVER
NEW-SETUP	Number	[1], new-setup.SETUP-CHANGEOVER

Table setup-changeovers

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DEFINITIONS	Number	[1], system use
SETUP-CHANGEOVER	Number	[1..*], setup-changeover.SETUP-CHANGEOVERS

Table setup-components

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-CONFIGURATION	Number	[1], system use
SETUP-DEFINITION	Number	[1], system use
FIXTURE-DEFINITION-KEY	Number	[0..*], fixture-definition-key.SETUP-COMPONENTS
FIXTURESET-DEFINITION-KEY	Number	[0..*], fixtureset-definition-key.SETUP-COMPONENTS
TOOL-DEFINITION-KEY	Number	[0..*], tool-definition-key.SETUP-COMPONENTS
TOOLSET-DEFINITION-KEY	Number	[0..*], toolset-definition-key.SETUP-COMPONENTS
LOGICAL-STRUCTURE	Number	[0..*], logical-structure.SETUP-COMPONENTS

Table setup-configuration

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-CONFIGURATIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SETUP-DEFINITION-KEY	Number	[1], setup-definition-key. SETUP-CONFIGURATION
SETUP-	Number	[1], setup-components.SETUP-

COMPONENTS		CONFIGURATION
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Table setup-configurations

Fields	Data Type	Description
INDEX	Number	[1], system use
STATION-CONFIGURATION	Number	[1], system use
MACHINE-CONFIGURATION	Number	[1], system use
CRANE-REQUIRED	Number	[1], system use
MACHINE-ASSIGNED	Number	[1], system use
MACHINE-USED	Number	[1], system use
MACHINE-STATUS	Number	[1], system use
CRANE-STATUS	Number	[1], system use
SETUP-CONFIGURATION	Number	[1..*], setup-configuration.SETUP-CONFIGURATIONS

Table setup-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DEFINITIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SETUP-COMPONENTS	Number	[1], setup-components.SETUP-DEFINITION
SETUP-RESOURCES-KEYS	Number	[1], setup-resources-keys.SETUP-DEFINITION
PARENT-SETUP-KEYS	Number	[0..1], parent-setup-keys.SETUP-DEFINITION
CHILD-SETUP-KEYS	Number	[0..1], child-setup-keys.SETUP-DEFINITION

Table setup-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-CONFIGURATION	Number	[1], system use
SETUP-	Number	[1], system use

DEFINITION-KEYS		
PARENT-SETUP-KEYS	Number	[1], system use
CHILD-SETUP-KEYS	Number	[1], system use
CURRENT-SETUP	Number	[1], system use
NEW-SETUP	Number	[1], system use
setup-definition-identifier	Number	[1]
setup-definition-number	Text	[1]

Table setup-definition-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
CRANE-ASSIGNED	Number	[1], system use
CRANE-USED	Number	[1], system use
WORK-ASSIGNMENT	Number	[1], system use
STATION-STATUS	Number	[1], system use
SETUP-DEFINITION-KEY	Number	[1..*], setup-definition-key.SETUP-DEFINITION-KEYS

Table setup-definitions

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SETUP-DEFINITION	Number	[1..*], setup-definition.SETUP-DEFINITIONS
SETUP-CHANGEOVERS	Number	[0..1], setup-changeovers.SETUP-DEFINITIONS

Table setup-duration

Fields	Data Type	Description
INDEX	Number	[1], system use
ESTIMATED-DURATIONS	Number	[1], system use
nominal-duration	Number /Double	[0..1]

	(Fixed)	
DURATION-DISTRIBUTIONS	Number	[0..1], duration-distributions.SETUP-DURATION

Table setup-resources-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-DEFINITION	Number	[1], system use
MACHINE-KEY	Number	[0..*], machine-key.SETUP-RESOURCES-KEYS
STATION-KEY	Number	[0..*], station-key.SETUP-RESOURCES-KEYS
CRANE-KEY	Number	[0..*], crane-key.SETUP-RESOURCES-KEYS

Table shift

Fields	Data Type	Description
INDEX	Number	[1], system use
SHIFTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
start-time	Date/Time	[1], hh:mm:ss
end-time	Date/Time	[0..1], hh:mm:ss
duration	Number /Double (Fixed)	[0..1]
DAYS-OF-WEEK	Number	[1], days-of-week.SHIFT
BREAKS	Number	[0..1], breaks.SHIFT

Table shift-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CALENDAR-MULTI-KEY	Number	[1], system use
shift-identifier	Number	[1]
shift-number	Text	[1]

Table shift-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
CALENDAR	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]

name	Text	[0..1]
description	Text	[0..1]
effective-start-date	Date/Time	[1], yyyy-mm-dd
effective-end-date	Date/Time	[1], yyyy-mm-dd
SHIFTS	Number	[1], shifts.SHIFT-SCHEDULE
HOLIDAYS	Number	[0..1], holidays.SHIFT-SCHEDULE

Table shift-schedule-key

Fields	Data Type	Description
INDEX	Number	[1], system use
CALENDAR-MULTI-KEY	Number	[1], system use
shift-schedule-identifier	Number	[1]
shift-schedule-number	Text	[1]

Table shifts

Fields	Data Type	Description
INDEX	Number /Integer	[1], system use
SHIFT-SCHEDULE	Number	[1], system use
SHIFT	Number	[1..*], shift.SHIFTS

Table shop-data

Fields	Data Type	Description
INDEX	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORGANIZATIONS	Number	[0..1], organizations.SHOP-DATA
CALENDARS	Number	[0..1], calendars.SHOP-DATA
RESOURCES	Number	[0..1], resources.SHOP-DATA
SKILL-DEFINITIONS	Number	[0..1], skill-definitions.SHOP-DATA
OPERATION-DEFINITIONS	Number	[0..1], operation-definitions.SHOP-DATA
SETUP-DEFINITIONS	Number	[0..1], setup-definitions.SHOP-DATA
MAINTENANCE-DEFINITIONS	Number	[0..1], maintenance-definitions.SHOP-DATA
LAYOUT	Number	[0..1], layout.SHOP-DATA

PARTS	Number	[0..1], parts.SHOP-DATA
BILLS-OF-MATERIALS	Number	[0..1], bills-of-materials.SHOP-DATA
INVENTORY	Number	[0..1], inventory.SHOP-DATA
PROCUREMENTS	Number	[0..1], procurements.SHOP-DATA
PROCESS-PLANS	Number	[0..1], process-plans.SHOP-DATA
WORK	Number	[0..1], work.SHOP-DATA
SCHEDULES	Number	[0..1], schedules.SHOP-DATA
TIME-SHEETS	Number	[0..1], time-sheets.SHOP-DATA
REFERENCES	Number	[0..1], references.SHOP-DATA
PROBABILITY-DISTRIBUTIONS	Number	[0..1], probability-distributions.SHOP-DATA
UNITS-OF-MEASUREMENT	Number	[0..1], units-of-measurement.SHOP-DATA

Table sick-leave-accrual-rate

Fields	Data Type	Description
INDEX	Number	[1], system use
PAY-STATUS	Number	[1], system use
rate	Number /Double (Fixed)	[1]
time-units	Enumeration	[0..1]
accrual-period	Number /Double (Fixed)	[0..1]

Table skill-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
SKILL-DEFINITIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
LEVELS	Text	[0..1], levels.SKILL-DEFINITION

Table skill-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SKILL-MULTI-KEY	Number	[1], system use
skill-definition-identifier	Number	[1]

skill-definition-number	Text	[1]
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Table skill-definitions

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
SKILL-DEFINITION	Number	[1..*], skill-definition.SKILL-DEFINITIONS

Table skill-multi-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SKILL-MULTI-KEYS	Number	[1], system use
SKILL-DEFINITION-KEY	Number	[1], skill-definition-key.SKILL-MULTI-KEY
LEVEL-DEFINITION-KEY	Number	[0..*], level-definition-key.SKILL-MULTI-KEY

Table skill-multi-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
EMPLOYEE-REQUIRED	Number	[1], system use
EMPLOYEE	Number	[1], system use
SKILL-MULTI-KEY	Number	[1..*], skill-multi-key.SKILL-MULTI-KEYS

Table station

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
hourly-rate	Number	[0..1]

	/Double (Fixed)	
employee-capacity	Number /Integer	[0..1]
MACHINE-KEYS	Number	[1], station-keys.STATION
STATION-STATUS	Number	[0..1], station-status.STATION

Table station-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS-ASSIGNED	Number	[1], system use
STATION-GROUP-KEY	Number	[0..1], station-group-key.STATION-ASSIGNED
STATION-KEY	Number	[0..1], station-key.STATION-ASSIGNED
EVENTS	Number	[0..1], events.STATION-ASSIGNED

Table station-configuration

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS-REQUIRED	Number	[1], system use
minimum-stations	Number /Integer	[1]
maximum-stations	Number /Integer	[1]
STATION-KEYS	Number	[1], station-keys.STATIONS-CONFIGURATION
SETUP-CONFIGURATIONS	Number	[0..1], setup-configurations.STATION-CONFIGURATION

Table station-group

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
hourly-rate	Number /Double (Fixed)	[0..1]

employee-capacity	Number /Integer	[0..1]
EMPLOYEE-KEYS	Number	[0..1], employee-keys.STATION-GROUP
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.STATION-GROUP
STATION-KEYS	Number	[1], station-keys.STATION-GROUP

Table station-group-key

Fields	Data Type	Description
INDEX	Number	[1], system use
STATION-KEYS	Number	[1], system use
STATION-ASSIGNED	Number	[1], system use
STATION-USED	Number	[1], system use
STATION-SCHEDULE	Number	[1], system use
station-group-identifier	Number	[1]
station-group-number	Text	[1]

Table station-key

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS-KEYS	Number	[1], system use
STATION-ASSIGNED	Number	[1], system use
STATION-USED	Number	[1], system use
MAINTAINED-RESOURCE-KEYS	Number	[1], system use
LOCATIONS-SERVED-KEYS	Number	[1], system use
SETUP-RESOURCES-KEYS	Number	[1], system use
STATION-SCHEDULE	Number	[1], system use
station-identifier	Number	[1]
station-number	Text	[1]

Table station-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
STATION-CONFIGURATON	Number	[1], system use
MACHINE	Number	[1], system use
MACHINE-GROUP	Number	[1], system use

STATION-GROUP	Number	[1], system use
OPERATION-DEFINITION	Number	[1], system use
STATION-KEY	Number	[0..*], station-key.STATION-KEYS
STATION-GROUP-KEY	Number	[0..*], station-group-key.STATION-KEYS

Table station-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS-SECTION	Number	[1], system use
STATION-KEY	Number	[0..1], station-key.STATION-SCHEDULE
STATION-GROUP-KEY	Number	[0..1], station-group-key.STATION-SCHEDULE
WORK-ASSIGNMENTS	Number	[1], work-assignemnts.STATION-SCHEDULE

Table station-status

Fields	Data Type	Description
INDEX	Number	[1], system use
STATION	Number	[1], system use
operational-state	Enumeration	[0..1]
maintenance-state	Enumeration	[0..1]
SETUP-DEFINITION-KEYS	Number	[0..1], setup-definition-keys.STATION-STATUS
EMPLOYEE-KEYS	Number	[0..1], employee-keys.STATION-STATUS
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.STATION-STATUS

Table station-used

Fields	Data Type	Description
INDEX	Number	[1], system use
STATIONS-USED	Number	[1], system use
STATION-GROUP-KEY	Number	[0..1], station-group-key.STATION-USED
STATION-KEY	Number	[0..1], station-key.STATION-USED
EVENTS	Number	[0..1], events.STATION-USED

Table stations

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]

number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
STATION	Number	[1..*], station.STATIONS
STATION-GROUP	Number	[0..*], station.group.STATIONS

Table stations-assigned

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-ASSIGNED	Number	[1], system use
number-of-stations	Number /Integer	[1]
STATION-ASSIGNED	Number	[1..*], station-assigned.STATIONS-ASSIGNED

Table stations-required

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-REQUIRED	Number	[1], system use
STATION-CONFIGURATION	Number	[1..*], station-configuration.STATIONS-REQUIRED

Table stations-section

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-SECTION	Number	[1], system use
STATION-SCHEDULE	Number	[1..*], station-schedule.STATIONS-SECTION

Table stations-used

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES-USED	Number	[1], system use
number-of-stations	Number /Integer	[1]
STATION-USED	Number	[1..*], station-used.STATIONS-USED

Table status-code

Fields	Data Type	Description
INDEX	Number	[1], system use

WORK-SCHEDULED-PROGRESS	Number	[1], system use
WORK-ACTUAL-PROGRESS	Number	[1], system use
TOOL-INSTANCE	Number	[1], system use
TOOLSET-INSTANCE	Number	[1], system use
FIXTURE-INSTANCE	Number	[1], system use
FIXTURESET-INSTANCE	Number	[1], system use
PART-INSTANCE	Number	[1], system use
MATERIAL-INSTANCE	Number	[1], system use
PROCUREMENT-ITEM-STATUS	Number	[1], system use
PROCUREMENT-STATUS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
value	Enumeration	[0..1]
default	Enumeration	[0..1]

Table step-precedent-constraint

Fields	Data Type	Description
INDEX	Number	[1], system use
STEP-PRECEDENT-CONSTRAINTS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
PLAN-STEP-KEY	Number	[1], plan-step-key.STEP-PRECEDENT-CONSTRAINTS
PRECEDENT-PLAN-STEP-KEY	Number	[1], precedent-plan-step-key.STEP-PRECEDENT-CONSTRAINTS
logical-relationship	Enumeration	[0..1]
lag-percentage	Number /Double	[0..1]
lag-duration	Number /Double (Fixed)	[0..1]

Table step-precedent-constraints

Fields	Data Type	Description
INDEX	Number	[1], system use
PLAN-DEFINITION	Number	[1], system use
STEP-PRECEDENT-CONSTRAINT	Number	[1..*], step-precedent-constraint.STEP-PRECEDENT-CONSTRAINTS

Table stock-level-quantities

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INVENTORY-ITEM	Number	[1], system use
TOOLSET-INVENTORY-ITEM	Number	[1], system use
FIXTURE-INVENTORY-ITEM	Number	[1], system use
FIXTURESET-INVENTORY-ITEM	Number	[1], system use
PART-INVENTORY-ITEM	Number	[1], system use
MATERIALS-INVENTORY-ITEM	Number	[1], system use
on-hand-quantity	Number /Integer	[1]
allocated-quantity	Number /Integer	[0..1]
safety-stock-quantity	Number /Integer	[0..1]
required-quantity	Number /Integer	[0..1]
on-order-quantity	Number /Integer	[0..1]
back-order-quantity	Number /Integer	[0..1]
work-in-process-quantity	Number /Integer	[0..1]

Table suppliers

Fields	Data Type	Description
INDEX	Number	[1], system use
PART	Number	[1], system use
PROCUREMENT-DEFINITION	Number	[1], system use
ORGANIZATIONAL-	Number	[1..*], organizational-contact.SUPPLIERS

CONTACT		
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Table target-machines

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-PROGRAM	Number	[1], system use
MACHINE-KEYS	Number	[1..*], machine-keys.TARGET-MACHINES
controller-type	Enumeration	[0..1]

Table task

Fields	Data Type	Description
INDEX	Number	[1], system use
TASKS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TASK-DEFINITION	Number	[0..1], task-definition.TASK
TASK-STATUS	Number	[0..1], task-status.TASK

Table task-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
TASK	Number	[1], system use
CUSTOMERS	Number	[0..1], customers.TASK-DEFINITION
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.TASK-DEFINITION
PART-QUANTITIES	Number	[1], part-quantities.TASK-DEFINITION
PROCESS-PLAN-MULTI-KEY	Number	[0..1], process-plan-multi-key.TASK-DEFINITION
repetition-count	Number /Integer	[0..1]
PARAMETERS	Number	[0..1], parameters.TASK-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.TASK-DEFINITION
CHILD-WORK-ITEMS	Number	[0..1], child-work-items.TASK-DEFINITION
PRECEDENT-CONSTRAINTS	Number	[0..1], precedent-constraints.TASK-DEFINITION
ESTIMATED-DURATIONS	Number	[0..1], estimated-durations.TASK-DEFINITION

COST-SUMMARY	Number	[0..1], cost-summary.TASK-DEFINITION
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Table task-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
TASK-SCHEDULE	Number	[1], system use
task-identifier	Number	[1]
task-number	Text	[1]

Table task-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
TASKS-SECTION	Number	[1], system use
TASK-KEY	Number	[1], task.key.TASK-SCHEDULE
RESOURCES-ASSIGNED	Number	[1], resources-assigned.TASK-SCHEDULE

Table task-status

Fields	Data Type	Description
INDEX	Number	[1], system use
TASK	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.TASK-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.TASK-STATUS

Table tasks

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TASK	Number	[1..*], task.TASKS

Table tasks-section

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use

TASK-SCHEDULE	Number	[1..*], task-schedule.TASKS-SECTION
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Table time-sheet

Fields	Data Type	Description
INDEX	Number	[1], system use
TIME-SHEETS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
EMPLOYEE-KEY	Number	[1], employee-key.TIME-SHEET
pay-period	Number /Double (Fixed)	[1]
overtime-eligibility	Enumeration	[0..1]
hours-regular-time	Number /Double (Fixed)	[0..1]
hours-overtime	Number /Double (Fixed)	[0..1]
hours-vacation	Number /Double (Fixed)	[0..1]
hours-sick-leave	Number /Double (Fixed)	[0..1]
hours-holiday	Number /Double (Fixed)	[0..1]
hours-unpaid	Number /Double (Fixed)	[0..1]
total-hours	Number /Double (Fixed)	[0..1]
total-days-absent	Number /Double (Fixed)	[0..1]

Table time-sheets

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]

identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TIME-SHEET	Number	[1..*], time-sheet.TIME-SHEETS

Table tool-catalog

Fields	Data Type	Description
INDEX	Number	[1], system use
RESOURCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOL-DEFINITION	Number	[1..*], tool-definition.TOOL-CATALOG
TOOLSET-DEFINITION	Number	[0..*], toolset-definition.TOOL-CATALOG

Table tool-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-CATALOG	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
PART-KEY	Number	[0..1], part-key.TOOL-DEFINITION

Table tool-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-COMPONENTS	Number	[1], system use
TOOL-ORDER-DEFINITION	Number	[1], system use
TOOLSET-MEMBER-KEYS	Number	[1], system use

TOOL-INVENTORY-ITEM	Number	[1], system use
tool-definition-identifier	Number	[1]
tool-definition-number	Text	[1]

Table tool-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code.TOOL-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.TOOL-INSTANCE

Table tool-instance-key

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INSTANCE-KEYS	Number	[1], system use
tool-instance-identifier	Number	[1]
tool-instance-number	Text	[1]

Table tool-instance-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOLSET-INSTANCE	Number	[1], system use
TOOL-INSTANCE-KEY	Number	[1..*], tool-instance-key.TOOL-INSTANCE-KEYS

Table tool-instances

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INVENTORY-ITEM	Number	[1], system use
TOOL-INSTANCE	Number	[1..*], tool-instance.TOOL-INSTANCES

Table tool-inventory

Fields	Data Type	Description
INDEX	Number	[1], system use

INVENTORY	Number	[1], system use
TOOL-INVENTORY-ITEM	Number	[1..*], tool-inventory-item.TOOL-INVENTORY
TOOLSET-INVENTORY-ITEM	Number	[0..*], toolset-inventory-item.TOOL-INVENTORY

Table tool-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOL-DEFINITION-KEY	Number	[1], tool-definition-key.TOOL-INVENTORY-ITEM
STOCK-LEVEL-QUANTITIES	Number	[1], stock-level-quantities.TOOL-INVENTORY-ITEM
PROCUREMENT-MULTI-KEYS	Number	[0..1], procurement-multi-keys.TOOL-INVENTORY-ITEM
TOOL-INSTANCES	Number	[0..1], tool-instances.TOOL-INVENTORY-ITEM

Table tool-order

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-ORDERS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1],reference-keys.SOURCE
REVISIONS	Text	[0..1],revisions.SOURCE
TOOL-ORDER-DEFINITION	Number	[0..1], tool-order-definition.TOOL-ORDER
TOOL-ORDER-STATUS	Number	[0..1], tool-order-status.TOOL-ORDER

Table tool-order-definition

Fields	Data Type	Description
INDEX	Number	[1], system use

TOOL-ORDER	Number	[1], system use
CUSTOMERS	Number	[0..1], customers.TOOL-ORDER-DEFINITION
priority-rating	Enumeration	[0..1]
DUE-DATES	Number	[1], due-dates.TOOL-ORDER-DEFINITION
TOOL-DEFINITION-KEY	Number	[0..*], tool-definition-key.TOOL-ORDER-DEFINITION
TOOLSET-DEFINITION-KEY	Number	[0..*], toolset-definitioni-key.TOOL-ORDER-DEFINITION
RESOURCES-REQUIRED	Number	[0..1], resources-required.TOOL-ORDER-DEFINITION
WORK-KEYS	Number	[0..1], work-keys.TOOL-ORDER-DEFINITION
COST-SUMMARY	Number	[0..1], cost-summary.TOOL-ORDER-DEFINITION

Table tool-order-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-KEYS	Number	[1], system use
TOOL-ORDER-SCHEDULE	Number	[1], system use
tool-order-identifier	Number	[1]
tool-order-number	Text	[1]

Table tool-order-schedule

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-ORDERS-SECTION	Number	[1], system use
TOOL-ORDER-KEY	Number	[1], tool-order.key.TOOL-ORDER-SCHEDULE
RESOURCES-ASSIGNED	Number	[1], resources-assigned.TOOL-ORDER-SCHEDULE

Table tool-order-status

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-ORDER	Number	[1], system use
WORK-SCHEDULED-PROGRESS	Number	[0..1], work-scheduled-progress.TOOL-ORDER-STATUS
WORK-ACTUAL-PROGRESS	Number	[0..1], work-actual-progress.TOOL-ORDER-STATUS

Table tool-orders

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOL-ORDER	Number	[1..*], tool-order.TOOL-ORDERS

Table tool-orders-section

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-SECTION	Number	[1], system use
TOOL-ORDER-SCHEDULE	Number	[1..*], tool-order-schedule.TOOL-ORDERS-SECTION

Table toolset-definition

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-CATALOG	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOLSET-MEMBER-KEYS	Number	[1], toolset-member-keys.TOOLSET-DEFINITION

Table toolset-definition-key

Fields	Data Type	Description
INDEX	Number	[1], system use
SETUP-COMPONENTS	Number	[1], system use
TOOL-ORDER-DEFINITION	Number	[1], system use
TOOLSET-MEMBER-KEYS	Number	[1], system use
TOOLSET-INVENTORY-ITEM	Number	[1], system use

toolset-definition-identifier	Number	[1]
toolset-definition-number	Text	[1]

Table toolset-instance

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOLSET-INSTANCES	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
current-location	Text	[0..1]
STATUS-CODE	Number	[0..1], status-code.TOOLSET-INSTANCE
TOOL-INSTANCE-KEYS	Number	[1], tool-instance-keys.TOOLSET-INSTANCE
WORK-ASSIGNMENTS	Number	[0..1], work-assignments.TOOLSET-INSTANCE

Table toolset-instances

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOLSET-INVENTORY-ITEM	Number	[1], system use
TOOLSET-INSTANCE	Number	[1..*], toolset-instance.TOOLSET-INSTANCES

Table toolset-inventory-item

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOL-INVENTORY	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
TOOLSET-DEFINITION-KEY	Number	[1], toolset-definition-key.TOOLSET-INVENTORY-ITEM
STOCK-LEVEL-QUANTITIES	Number	[1], stock-level-quantities.TOOLSET-INVENTORY-ITEM
PROCUREMENT-	Number	[0..1], procurement-multi-keys.TOOLSET-

MULTI-KEYS		INVENTORY-ITEM
TOOLSET-INSTANCES	Number	[0..1], toolset-instances.TOOLSET- INVENTORY-ITEM

Table toolset-member-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
TOOLSET-DEFINITION	Number	[1], system use
TOOL-DEFINITION-KEY	Number	[0..*], tool-definition-key.TOOLSET- MEMBER-KEYS
TOOLSET-DEFINITION-KEY	Number	[0..*], toolset-definition-key.TOOLSET- MEMBER-KEYS

Table total-operations-duration

Fields	Data Type	Description
INDEX	Number	[1], system use
ESTIMATED-DURATIONS	Number	[1], system use
nominal-duration	Number /Double (Fixed)	[0..1]
DURATION-DISTRIBUTIONS	Number	[0..1], duration-distributions.TOTAL- OPERATIONS-DURATION

Table translation

Fields	Data Type	Description
INDEX	Number	[1], system use
FROM-REFERENCE-FRAME	Number	[1], system use
x-coefficient	Number /Double	[1]
y-coefficient	Number /Double	[1]
z-coefficient	Number /Double	[1]

Table type-area *

Fields	Data Type	Description
classification-items	Text	[1..*]

* All table names with "type-" prefix carry the same data structure as Table type-area. These tables, listed below, are used to define type for each corresponding object. Type is an enumeration of a set of classification items.

Table type-availability-exception	Table type-bill-of-materials
Table type-bills-of-materials	Table type-boundary-element
Table type-bom-element	Table type-calendar

Table type-calendars	Table type-contact
Table type-crane	Table type-cranes
Table type-department	Table type-departments
Table type-department-structure	Table type-dimension
Table type-email	Table type-employee
Table type-employees	Table type-event
Table type-fixture-catalog	Table type-fixture-definition
Table type-fixture-instance	Table type-fixture-inventory-item
Table type-fixtureset-definition	Table type-fixtureset-instance
Table type-fixtureset-inventory-item	Table type-inventory
Table type-job	Table type-jobs
Table type-layout	Table type-level-definition
Table type-machine	Table type-machine-group
Table type-machine-program	Table type-machines
Table type-mail	Table type-maintenance-definition
Table type-maintenance-definitions	Table type-maintenance-order
Table type-maintenance-orders	Table type-material-instance
Table type-materials-inventory-item	Table type-operation-definition
Table type-operation-definitions	Table type-operation-sheet
Table type-order	Table type-order-item
Table type-orders	Table type-organization
Table type-organizations	Table type-parameter
Table type-part	Table type-parts
Table type-part-instance	Table type-part-inventory-item
Table type-part-object	Table type-path
Table type-phone	Table type-pick-order
Table type-pick-order-item	Table type-pick-orders
Table type-plan-parameter	Table type-plan-step
Table type-position	Table type-position-description
Table type-precedent-constraint	Table type-probability-distribution
Table type-probability-distributions	Table type-probability-distribution-set
Table type-process-plan	Table type-process-plans
Table type-procurement	Table type-procurement-item
Table type-reference	Table type-reference-frame
Table type-references	Table type-procurements
Table type-resource-object	Table type-resources
Table type-revision	Table type-routing-sheet
Table type-schedule	Table type-schedules
Table type-setup-configuration	Table type-setup-definition
Table type-setup-definitions	Table type-shift
Table type-shift-schedule	Table type-shop-data
Table type-skill-definition	Table type-skill-definitions
Table type-station	Table type-station-group
Table type-stations	Table type-status-code
Table type-step-precedent-constraint	Table type-task
Table type-tasks	Table type-time-sheet

Table type-time-sheets	Table type-tool-catalog
Table type-tool-definition	Table type-tool-instance
Table type-tool-inventory-item	Table type-tool-order
Table type-tool-orders	Table type-toolset-definition
Table type-toolset-instance	Table type-toolset-inventory-item
Table type-unit-of-measurement	Table type-work
Table type-work-item-group	

Table unit-operation-duration

Fields	Data Type	Description
INDEX	Number	[1], system use
ESTIMATED-DURATIONS	Number	[1], system use
nominal-duration	Number /Double (Fixed)	[0..1]
DURATION-DISTRIBUTIONS	Number	[0..1], duration-distributions.UNIT-OPERATION-DURATION

Table units-of-measurement

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
angular-units	Enumeration	[0..1]
currency-units	Enumeration	[0..1]
distance-units	Enumeration	[0..1]
length-units	Enumeration	[0..1]
mass-units	Enumeration	[0..1]
speed-units	Enumeration	[0..1]
time-duration-units	Enumeration	[0..1]
volume-units	Enumeration	[0..1]

Table use-logical-clause

Fields	Data Type	Description
INDEX	Number	[1], system use
LOGICAL-STRUCTURE	Number	[1], system use
identifier	Number	[1]

Table work

Fields	Data Type	Description
INDEX	Number	[1], system use
SHOP-DATA	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
description	Text	[0..1]
REFERENCE-KEYS	Text	[0..1], reference-keys.SOURCE
REVISIONS	Text	[0..1], revisions.SOURCE
ORDERS	Number	[0..1], orders.WORK
JOBS	Number	[0..1], jobs.WORK
TASKS	Number	[0..1], tasks.WORK
MAINTENANCE-ORDERS	Number	[0..1], maintenance-orders.WORK
PICK-ORDERS	Number	[0..1], pick-orders.WORK
TOOL-ORDERS	Number	[0..1], tool-orders.WORK

Table work-actual-progress

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-STATUS	Number	[1], system use
ORDER-ITEM-STATUS	Number	[1], system use
JOB-STATUS	Number	[1], system use
TASK-STATUS	Number	[1], system use
MAINTENANCE-ORDER-STATUS	Number	[1], system use
PICK-ORDER-STATUS	Number	[1], system use
PICK-ORDER-ITEM-STATUS	Number	[1], system use
TOOL-ORDER-STATUS	Number	[1], system use
material-availability-date	Date/Time	[0..1], yyyy-mm-dd
STATUS-CODE	Number	[0..1], status-code.WORK-ACTUAL-PROGRESS
RESOURCES-USED	Number	[0..1], resources-used.WORK-ACTUAL-PROGRESS
EVENTS	Number	[0..1], events.WORK-ACTUAL-PROGRESS
setup-time-applied	Number /Double	[0..1]
operation-time-applied	Number	[0..1]

	/Double	
percent-completion	Number /Double	[0..1]
COST-SUMMARY	Number	[0..1], cost-summary.WORK-ACTUAL-PROGRESS
PARTS-COMPLETED	Number	[0..1], parts-completed.WORK-ACTUAL-PROGRESS

Table work-assignment

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-ASSIGNMENTS	Number	[1], system use
WORK-KEYS	Number	[0..1], work-keys.WORK-ASSIGNEMNT
SETUP-DEFICITION-KEYS	Number	[0..1], setup-definition-keys.WORK-ASSIGNEMNT
EVENTS	Number	[0..1], events.WORK-ASSIGNEMNT

Table work-assignments

Fields	Data Type	Description
INDEX	Number	[1], system use
MACHINE-STATUS	Number	[1], system use
MACHINE-GROUP	Number	[1], system use
STATION-STATUS	Number	[1], system use
STATION-GROUP	Number	[1], system use
CRANE-STATUS	Number	[1], system use
EMPLOYEE-STATUS	Number	[1], system use
TOOL-INSTANCE	Number	[1], system use
TOOLSET-INSTANCE	Number	[1], system use
FIXTURE-INSTANCE	Number	[1], system use
FIXTURESET-INSTANCE	Number	[1], system use
PART-INSTANCE	Number	[1], system use
MATERIAL-INSTANCE	Number	[1], system use
STATION-SCHEDULE	Number	[1], system use
MACHINE-SCHEDULE	Number	[1], system use
CRANE-SCHEDULE	Number	[1], system use
EMPLOYEE-SCHEDULE	Number	[1], system use

WORK-ASSIGNMENT	Number	[1..*], work-assignment.WORK-ASSIGNMENTS
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Table work-item

Fields	Data Type	Description
INDEX	Number	[1], system use
PRECEDENT-CONSTRAINT	Number	[1], system use
WORK-KEYS	Number	[1], work-keys.WORK-ITEM

Table work-item-group

Fields	Data Type	Description
INDEX	Number	[1], system use
CHILD-WORK-ITEMS	Number	[1], system use
type	Enumeration	[0..1]
identifier	Number	[1]
number	Text	[1]
name	Text	[0..1]
logical-relationship	Enumeration	[1]
WORK-KEYS	Number	[0..1], work-keys.WORK-ITEM-GROUP
WORK-ITEM-GROUP-KEY	Number	[0..1], work-item-group-key.WORK-ITEM-GROUP

Table work-item-group-key

Fields	Data Type	Description
INDEX	Number	[1], system use
WORK-ITEM-GROUP	Number	[1], system use
work-item-group-identifier	Number	[1]
work-item-group-number	Text	[1]

Table work-keys

Fields	Data Type	Description
INDEX	Number	[1], system use
CHILD-WORK-ITEMS	Number	[1], system use
WORK-ITEM-GROUP	Number	[1], system use
WORK-ITEM	Number	[1], system use
PRECEDENT-WORK-ITEM	Number	[1], system use
PICK-ORDER-	Number	[1], system use

DEFINITION		
TOOL-ORDER-DEFINITION	Number	[1], system use
WORK-ASSIGNMENT	Number	[1], system use
PROCUREMENT-ITEM-DEFINITION	Number	[1], system use
ORDER-MULTI-KEY	Number	[0..*], order-multi-key.WORK-KEYS
JOB-KEY	Number	[0..*], job-key.WORK-KEYS
TASK-KEY	Number	[0..*], task-key.WORK-KEYS
PROCUREMENT-MULTI-KEY	Number	[0..*], procurement-multi-key.WORK-KEYS
PICK-ORDER-KEY	Number	[0..*], pick-order-key.WORK-KEYS
TOOL-ORDER-KEY	Number	[0..*], tool-order-key.WORK-KEYS
MAINTENANCE-ORDER-KEY	Number	[0..*], maintenance-order-key.WORK-KEYS

Table work-scheduled-progress

Fields	Data Type	Description
INDEX	Number	[1], system use
ORDER-STATUS	Number	[1], system use
ORDER-ITEM-STATUS	Number	[1], system use
JOB-STATUS	Number	[1], system use
TASK-STATUS	Number	[1], system use
MAINTENANCE-ORDER-STATUS	Number	[1], system use
PICK-ORDER-STATUS	Number	[1], system use
PICK-ORDER-ITEM-STATUS	Number	[1], system use
TOOL-ORDER-STATUS	Number	[1], system use
material-availability-date	Date/Time	[0..1], yyyy-mm-dd
STATUS-CODE	Number	[0..1], status-code.WORK-SCHEDULED-PROGRESS
RESOURCES-ASSIGNED	Number	[0..1], resources-assigned.WORK-SCHEDULED-PROGRESS
EVENTS	Number	[0..1], events.WORK-SCHEDULED-PROGRESS
COST-SUMMARY	Number	[0..1], cost-summary.WORK-SCHEDULED-PROGRESS

Table work-section

Fields	Data Type	Description
INDEX	Number	[1], system use
SCHEDULE	Number	[1], system use
ORDERS-SECTION	Number	[0..1], orders-section.WORK-SECTION
JOBS-SECTION	Number	[0..1], jobs-section.WORK-SECTION
TASKS-SECTION	Number	[0..1], tasks-section.WORK-SECTION
MAINTENANCE-ORDERS-SECTION	Number	[0..1], maintenance-orders-section.WORK-SECTION
PICK-ORDERS-SECTION	Number	[0..1], pick-orders-section.WORK-SECTION
TOOL-ORDERS-SECTION	Number	[0..1], pick-orders-section.WORK-SECTION

Appendix B: Enumerations

Table	Field	Enumeration items
enumeration-behavior	in-layout	TBD*
enumeration-controller-type	in-machine-program	TBD*
	in-machines	TBD*
enumeration-day-name	in-calendars	SUN, MON, TUE, WED, THR, FRI, SAT
enumeration-day-number	day-number	0, 1, 2, 3, 4, 5, 6
	day-name	SUN, MON, TUE, WED, THR, FRI, SAT
enumeration-efficiency-rating	in-machines	TBD*
enumeration-employment-status	in-employees	FULL-TIME, PART-TIME, CONTRACTOR, LAID-OFF, FORMER-EMPLOYEE
enumeration-file-format	in-references	WORD, TEXT, ...
enumeration-logical-relationship	in-child-work-items, in-plan-definition, in-precedent-constraints	AND, OR, NOT
enumeration-maintenance-state	in-cranes, in-machines, in-stations	COMPLETED, UNDER-REPAIR, TO-BE-REPAIR, UNKNOWN
enumeration-material-type	in-materials-inventory	TBD*
enumeration-operational-state	in-cranes, in-machines, in-stations	BUSY, IDLE, RESERVED, OUT-OF-ORDER
enumeration-operation-subtype	in-operation-definitions	TBD*
enumeration-operation-type	in-operation-definitions	TBD*
enumeration-overtime-eligibility	in-employees	YES, NO
	in-time-sheets	YES, NO
enumeration-priority-rating	in-departments	1, 2, 3, 4, 5
	in-organizations	1, 2, 3, 4, 5
	in-procurements	REGULAR, URGENT
	in-work	HOT, HOT-HOT, REGULAR
enumeration-salary-type	in-employees	TBD*
enumeration-status-code	in-inventory, in-work-actual-progress,	EXISTING, NOT-EXISTING, IN-ORDER,

* Enumeration items for this element have not been fully defined.

	in-work-scheduled-progress	PENDING, ACCEPTED, RELEASED, IN-PROGRESS, COMPLETE, CANCELLED
enumeration-units	angular-units	DEGREE, RADIAN
	currency-units	DOLLAR, EURO, YEN
	distance-units	MILE, FOOT, INCH, KILOMETER, METER, CENTIMETER
	length-units	MILE, FOOT, INCH, KILOMETER, METER, CENTIMETER
	mass-units	TON, POUND, OUNCE, KILOGRAM, GRAM
	speed-units	MILE/HOUR, KILOMETER/HOUR
	time-duration-units	DAY, HOUR, MINUTE, SECOND
	volume-units	OUNCE, MILLILITER, LITER, GALLON, CUBICFOOT, CUBICMETER, CUBICINCH, CUBICCENTIMETER
type-shop-data, type-calendars, type-organizations,	enumeration	TBD*

Appendix C: Relationships between tables

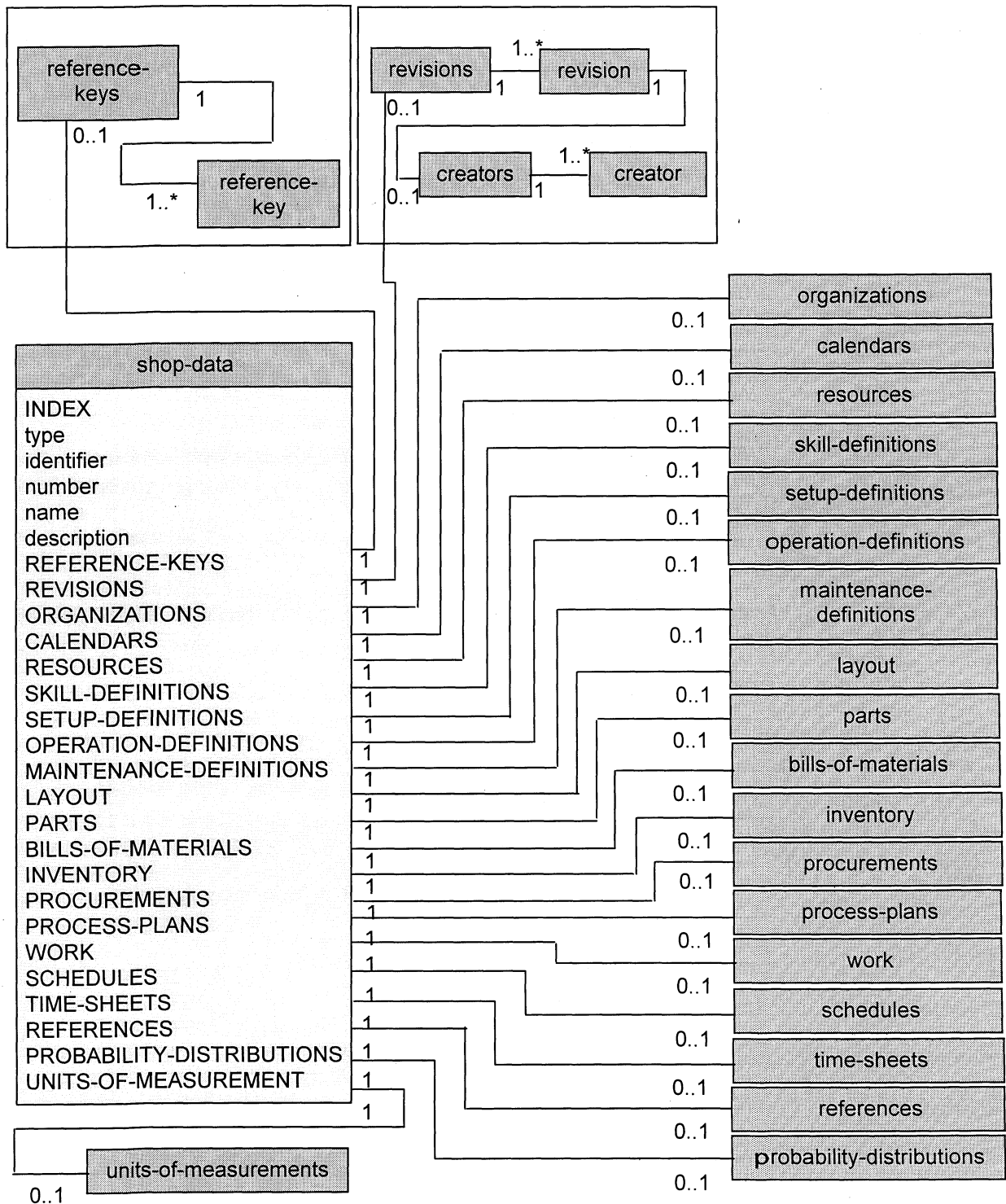


Figure C-1: *shop-data* and related tables

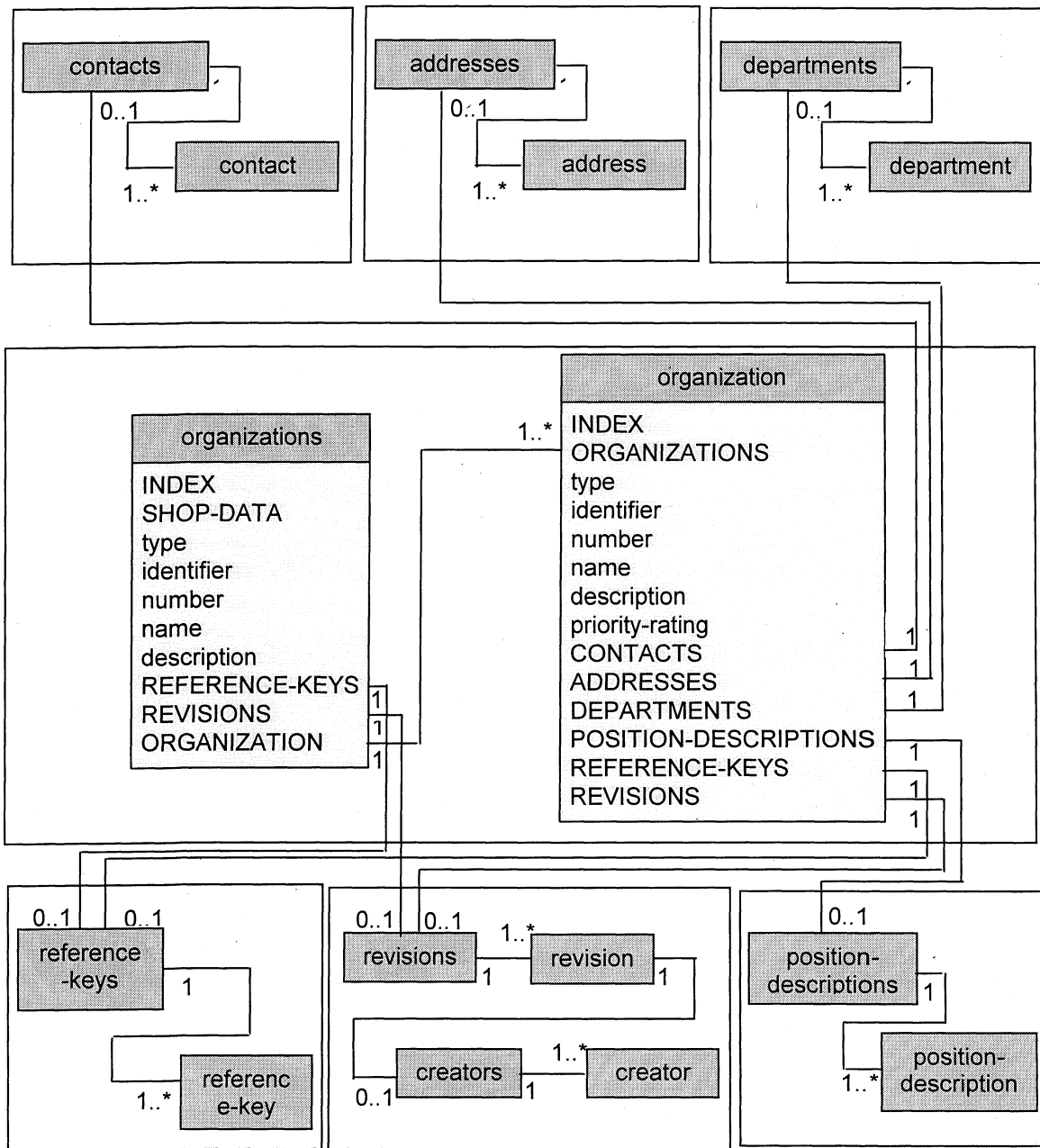


Figure C-2: organizations and related tables

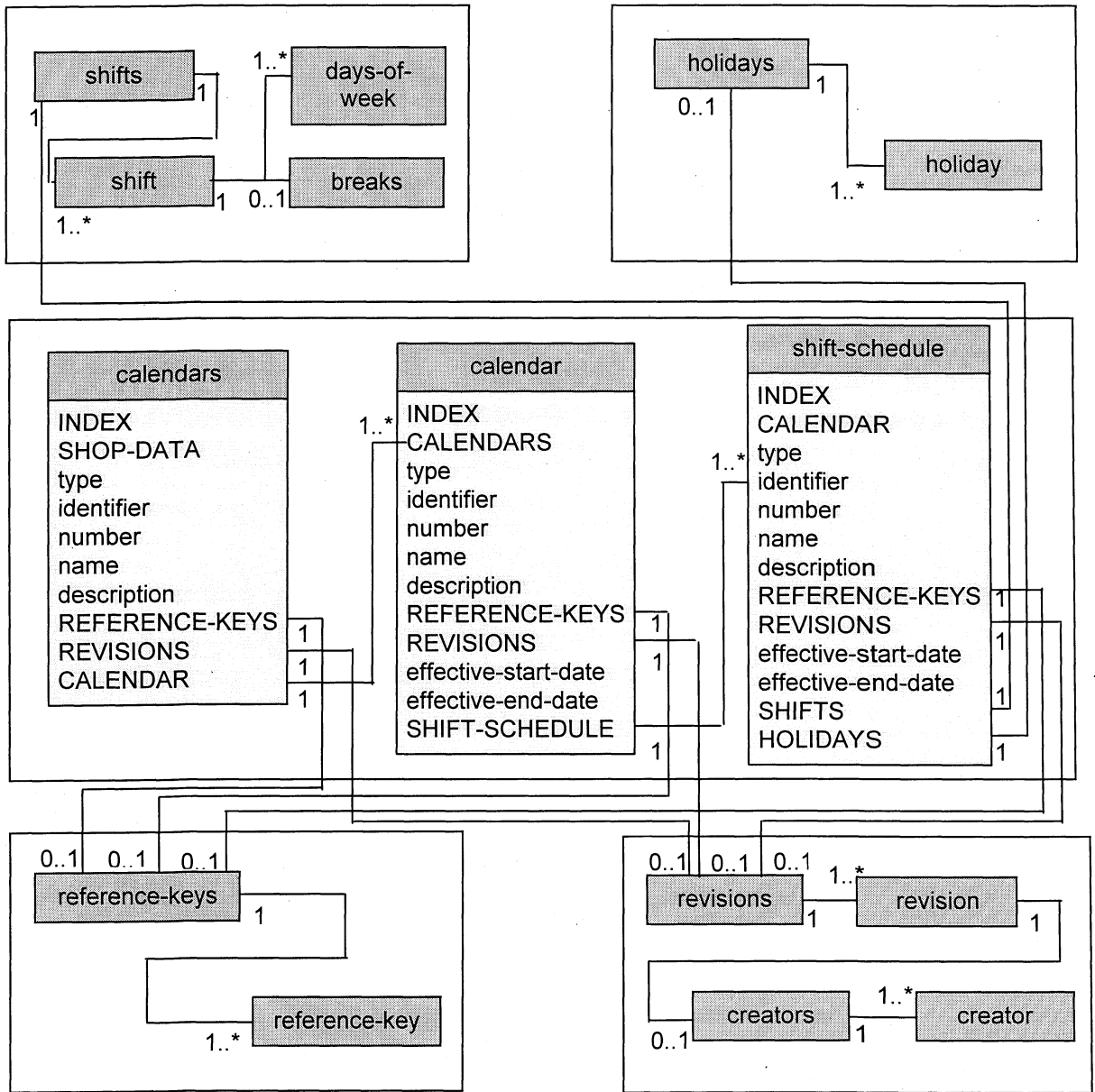


Figure C-3: *calendars* and related tables

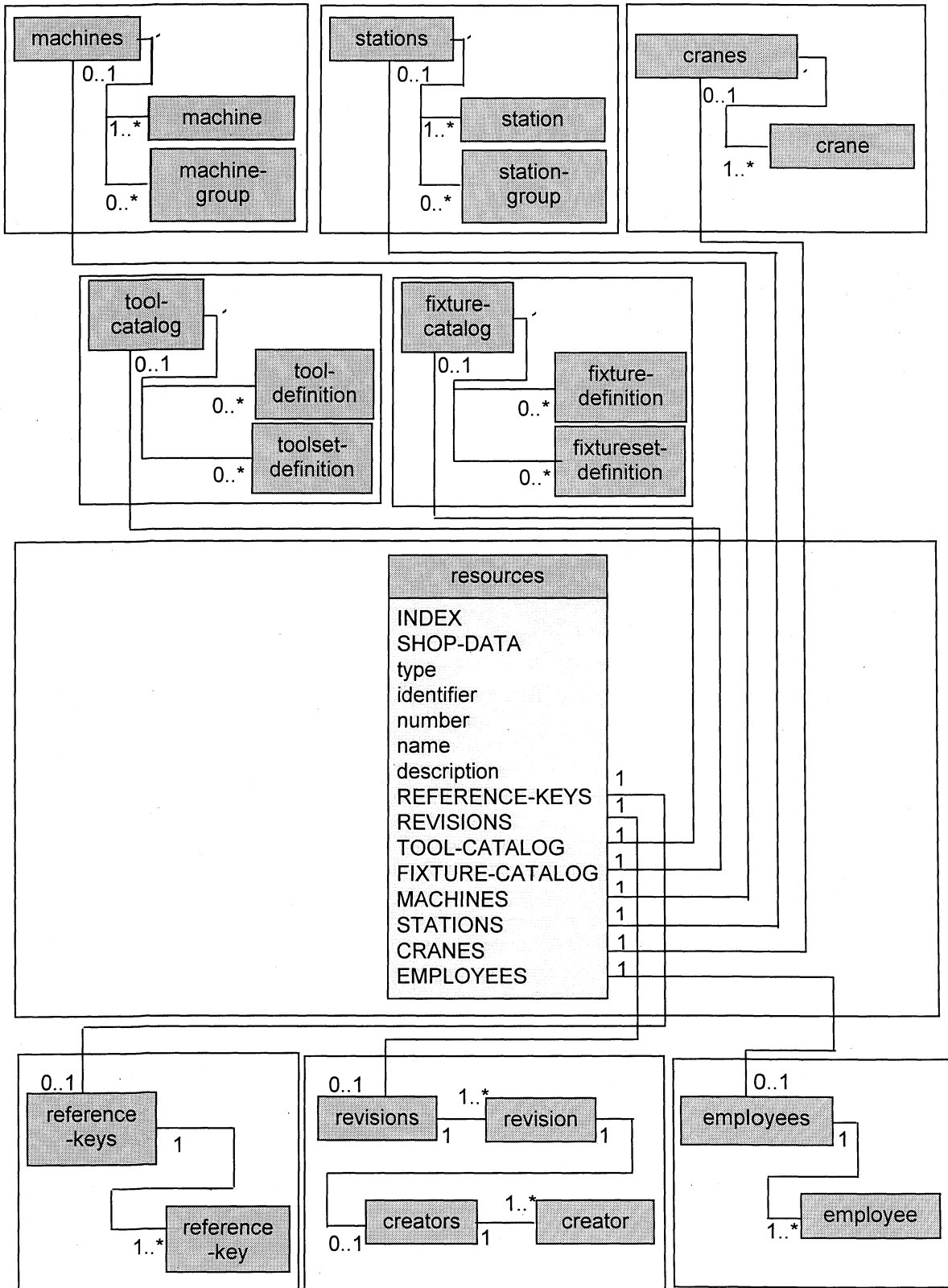


Figure C-4: *resources* and related tables

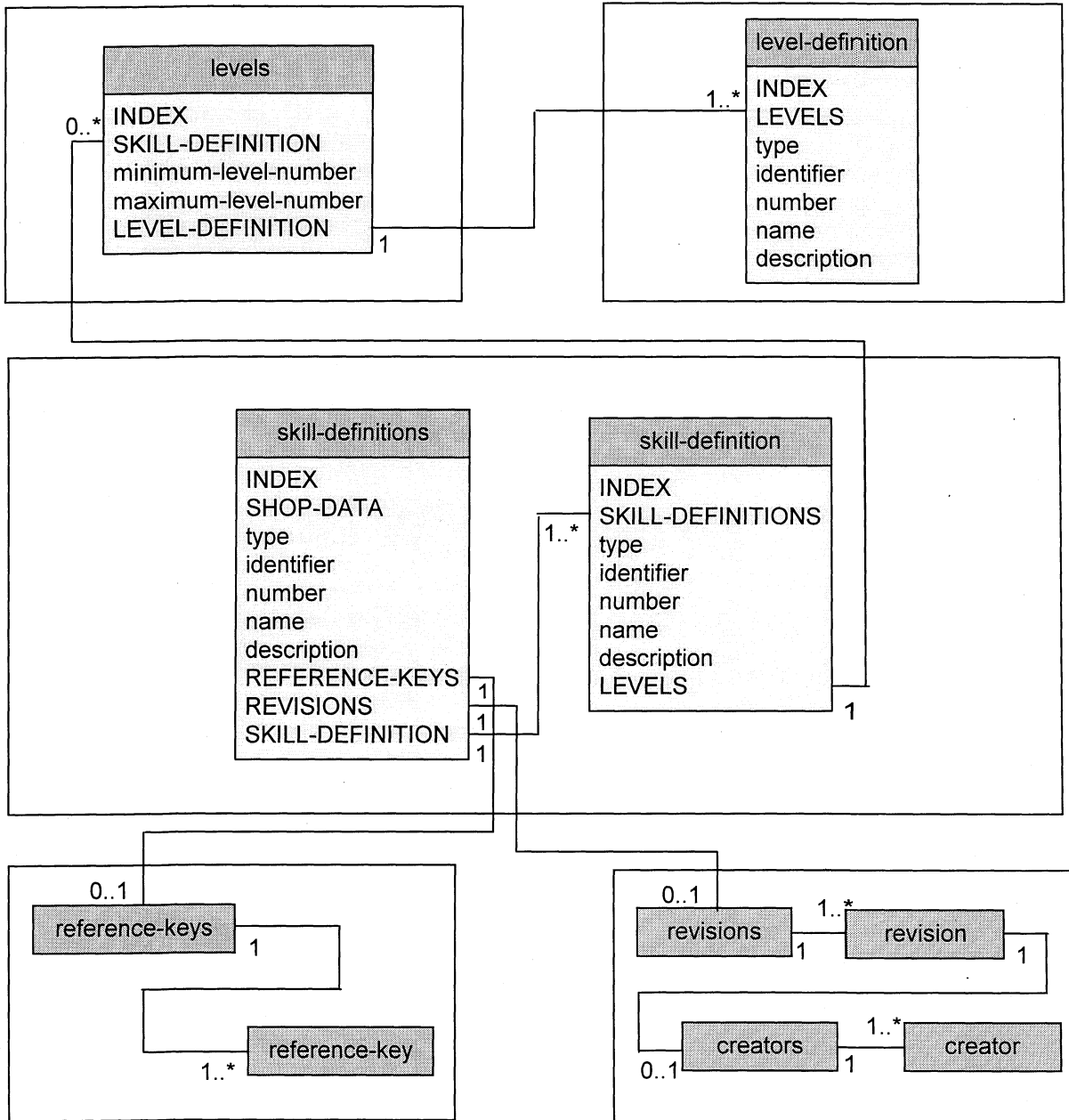


Figure C-5: *skill-definitions* and related tables

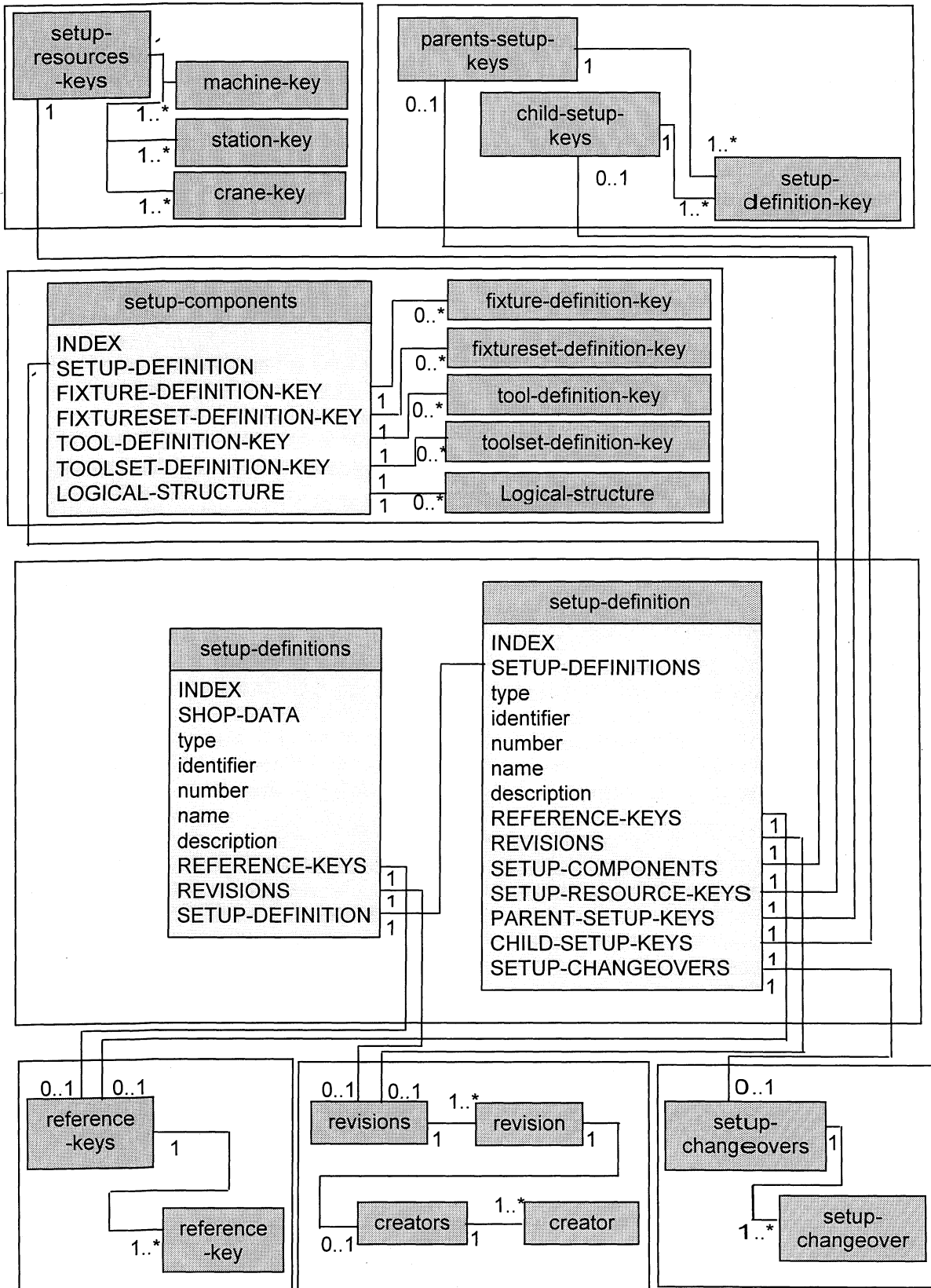


Figure C-6: *setup-definitions* and related tables

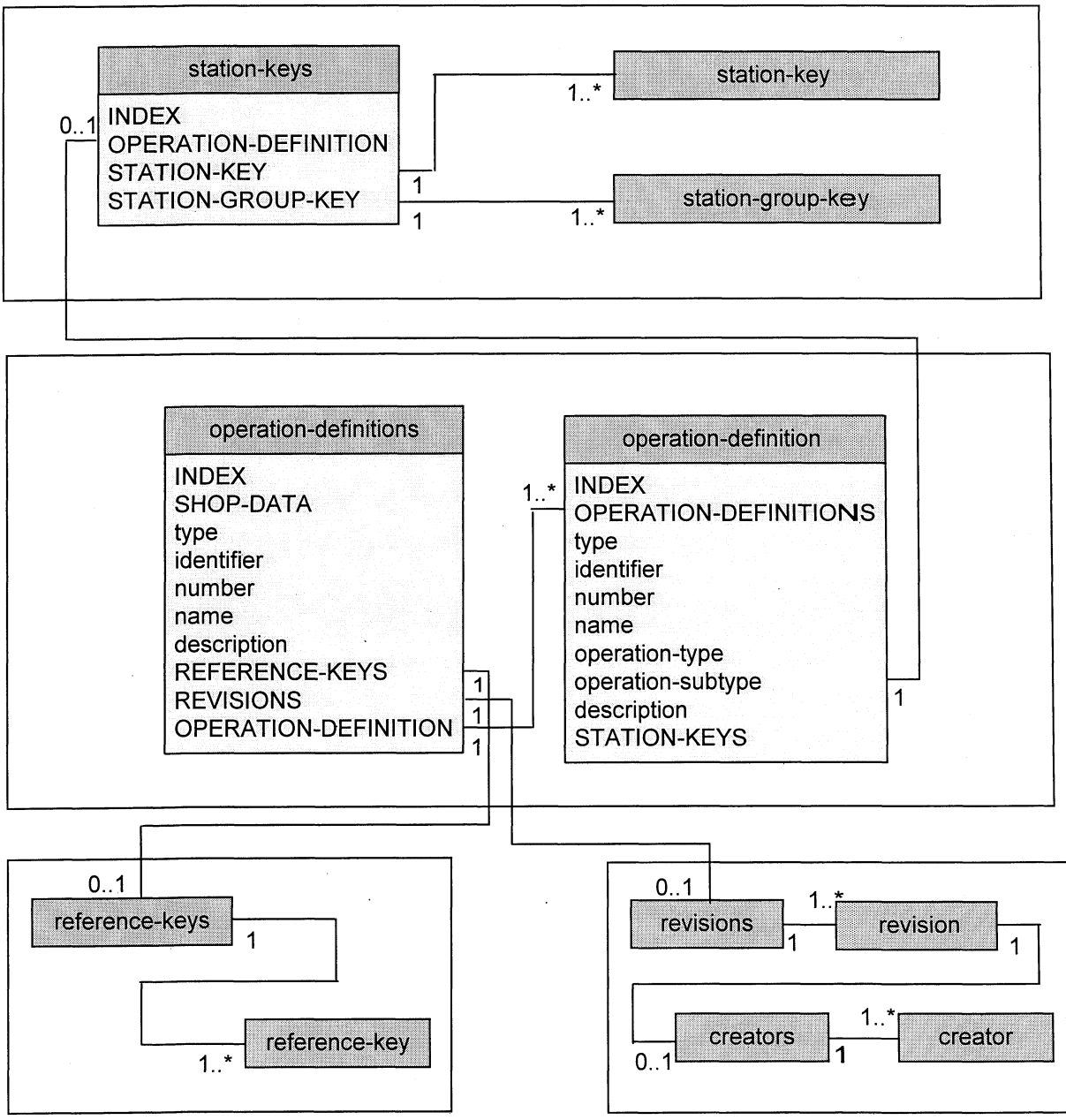


Figure C-7: operation-definitions and related tables

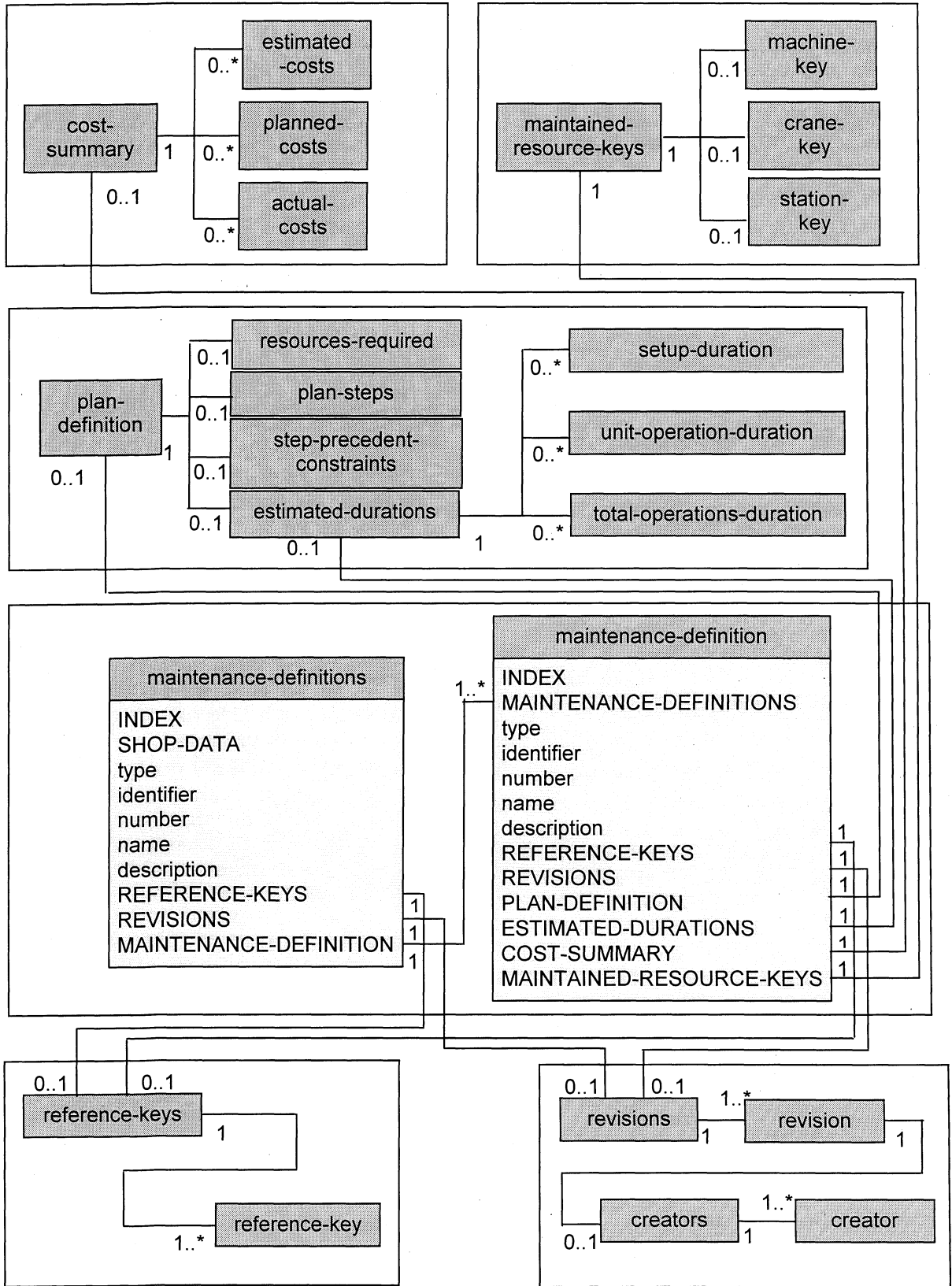


Figure C-8: *maintenance-definitions* and related tables

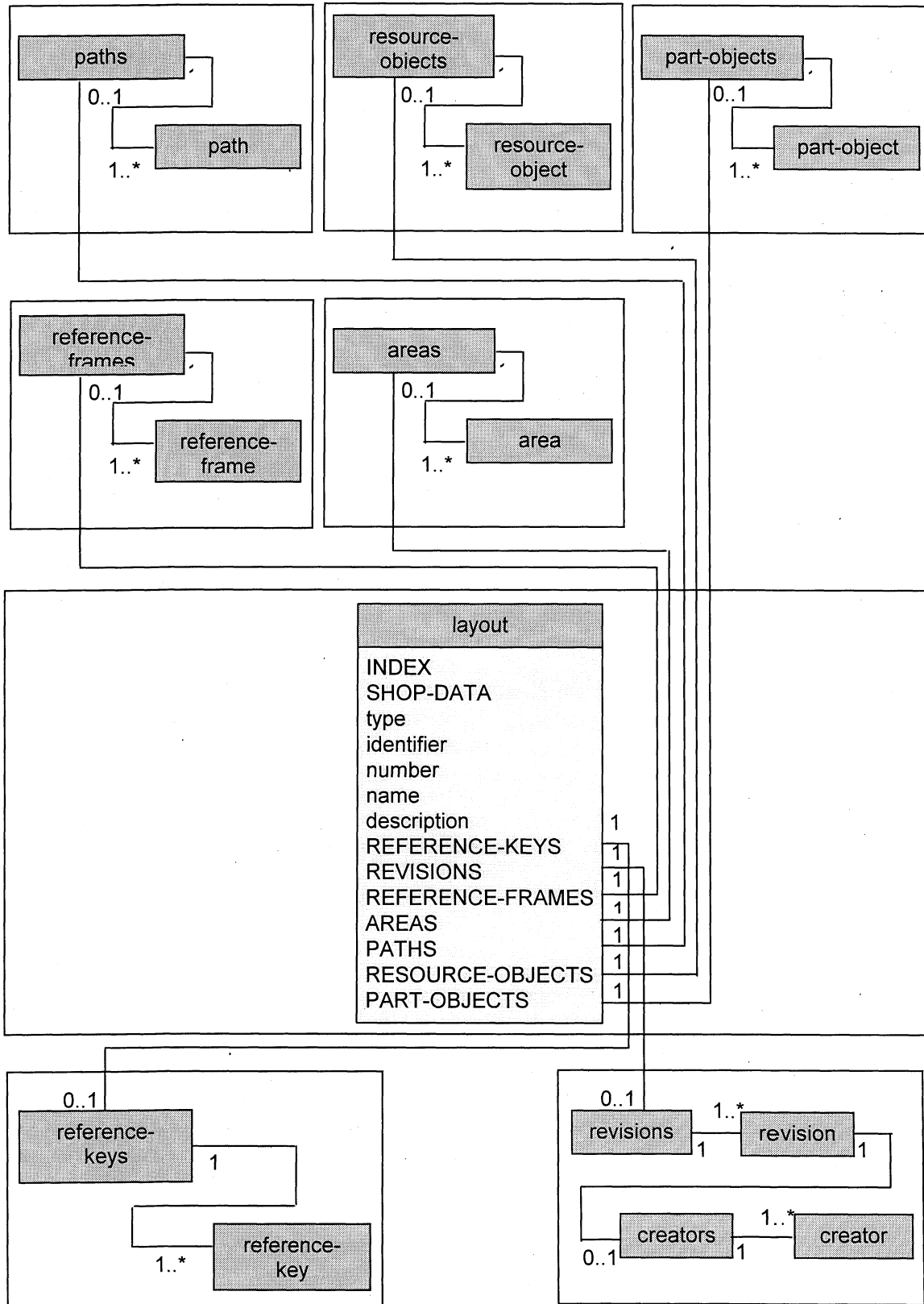


Figure C-9: *layout* and related tables

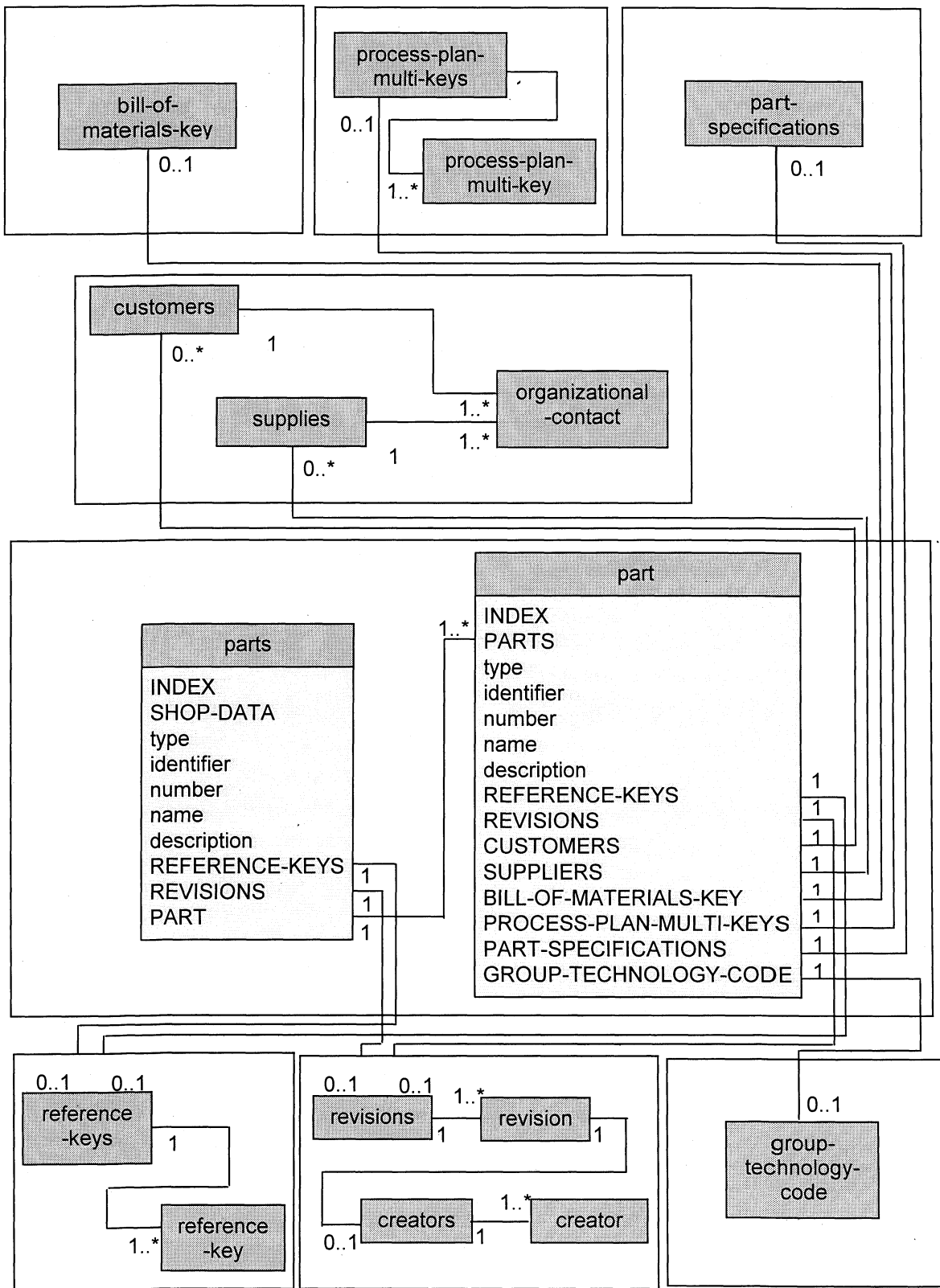


Figure C-10: *parts* and related tables

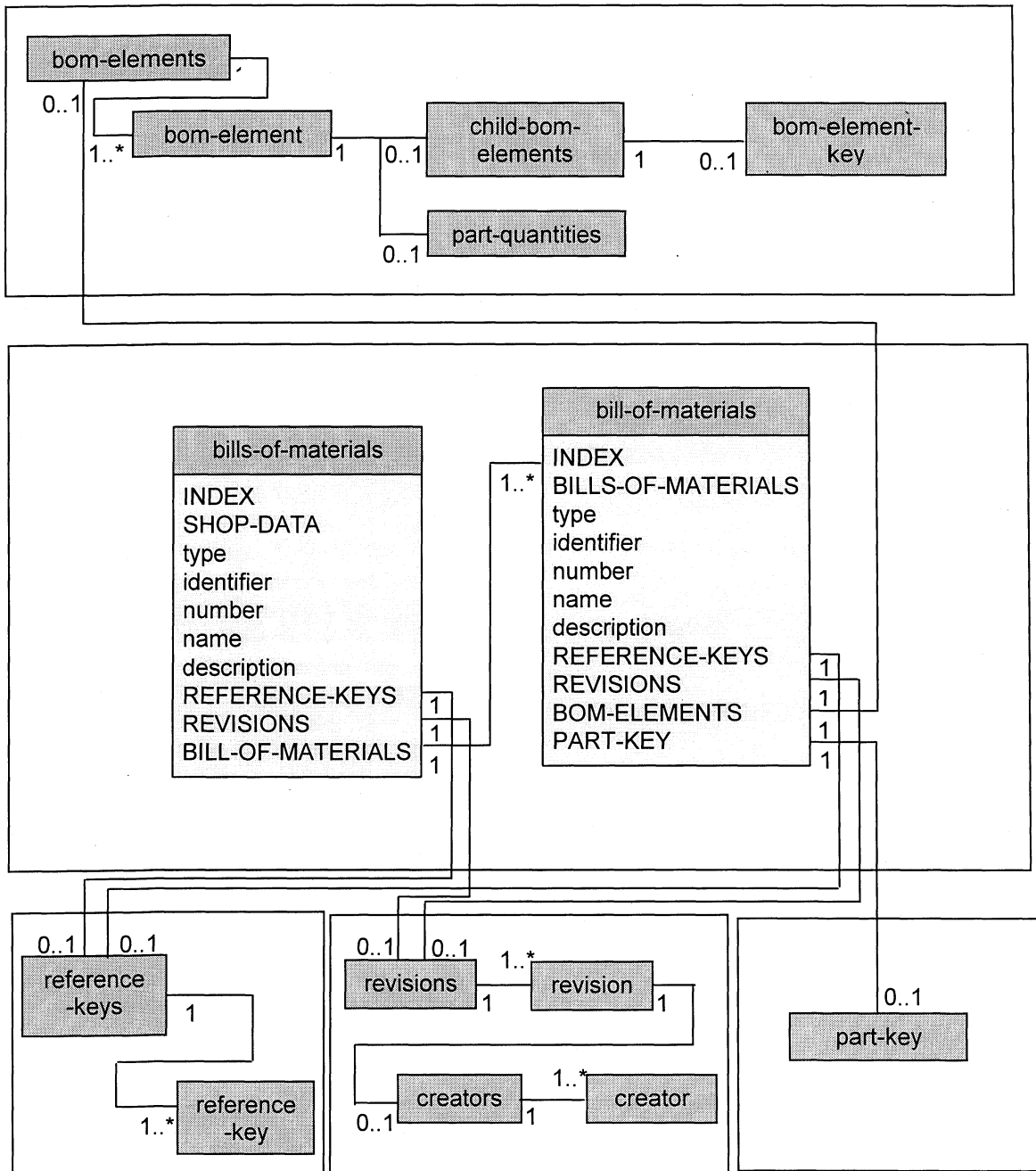


Figure C-11: *bills-of-materials* and related tables

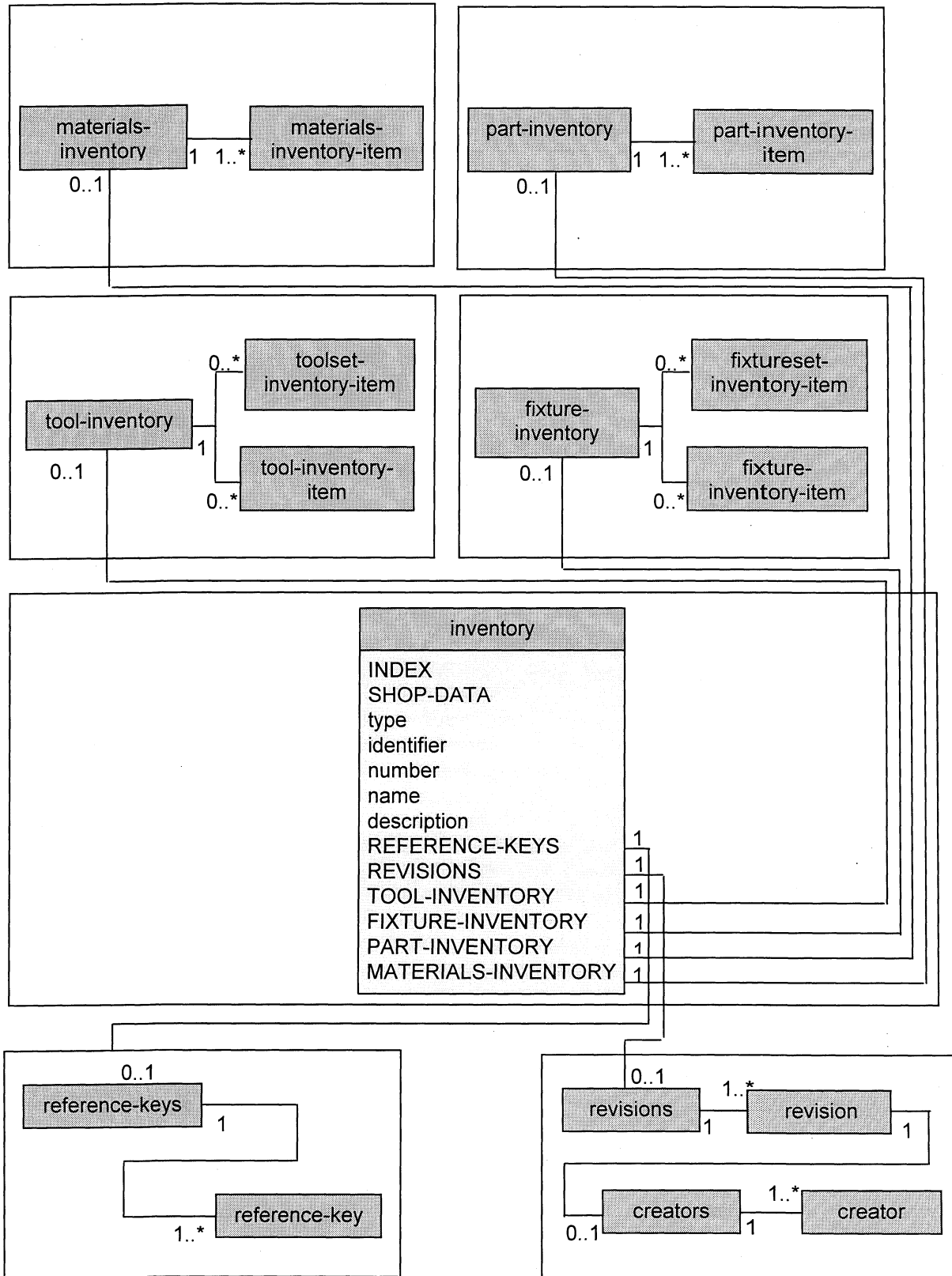


Figure C-12: *inventory* and related tables

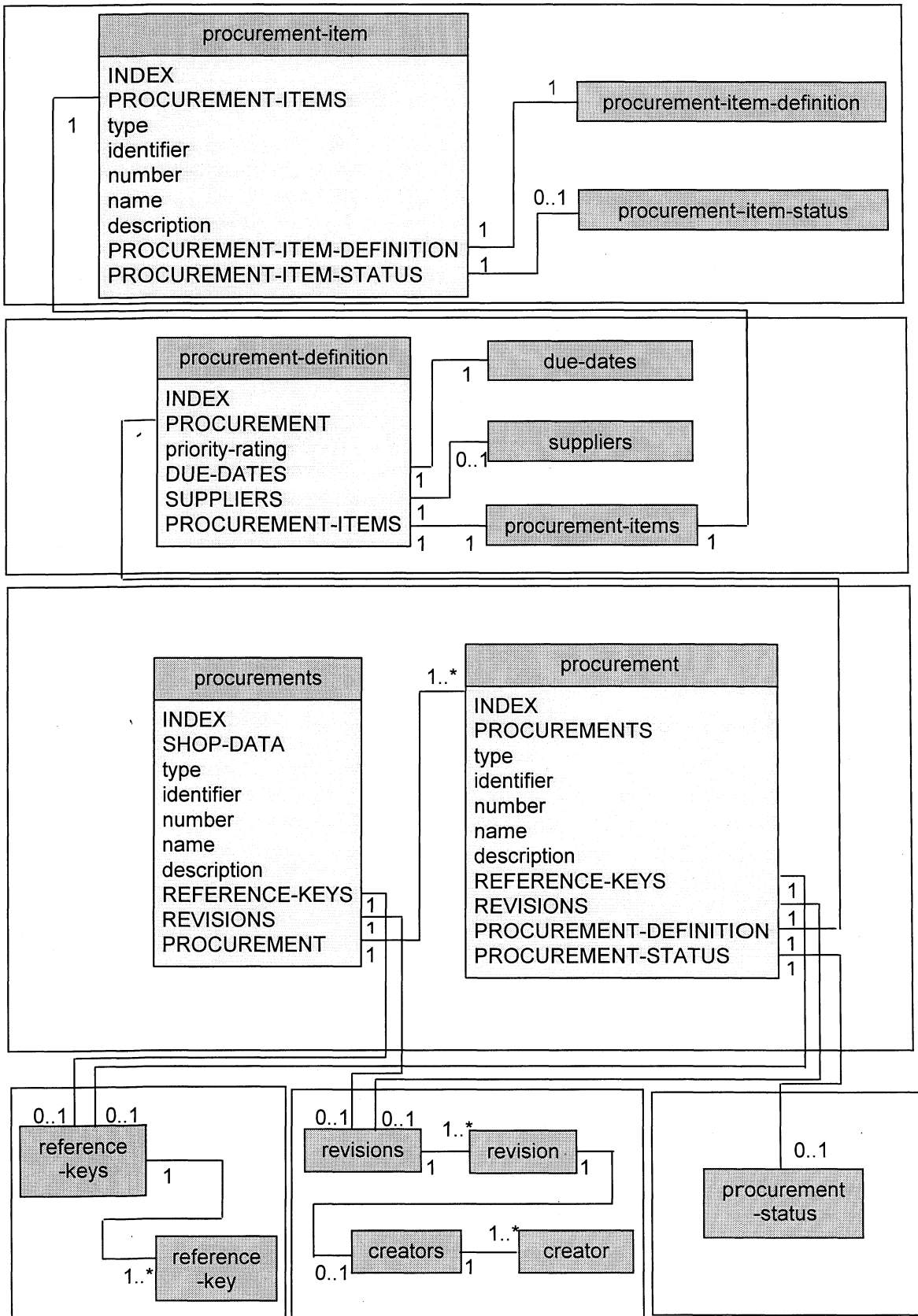


Figure C-13: *procurements* and related tables

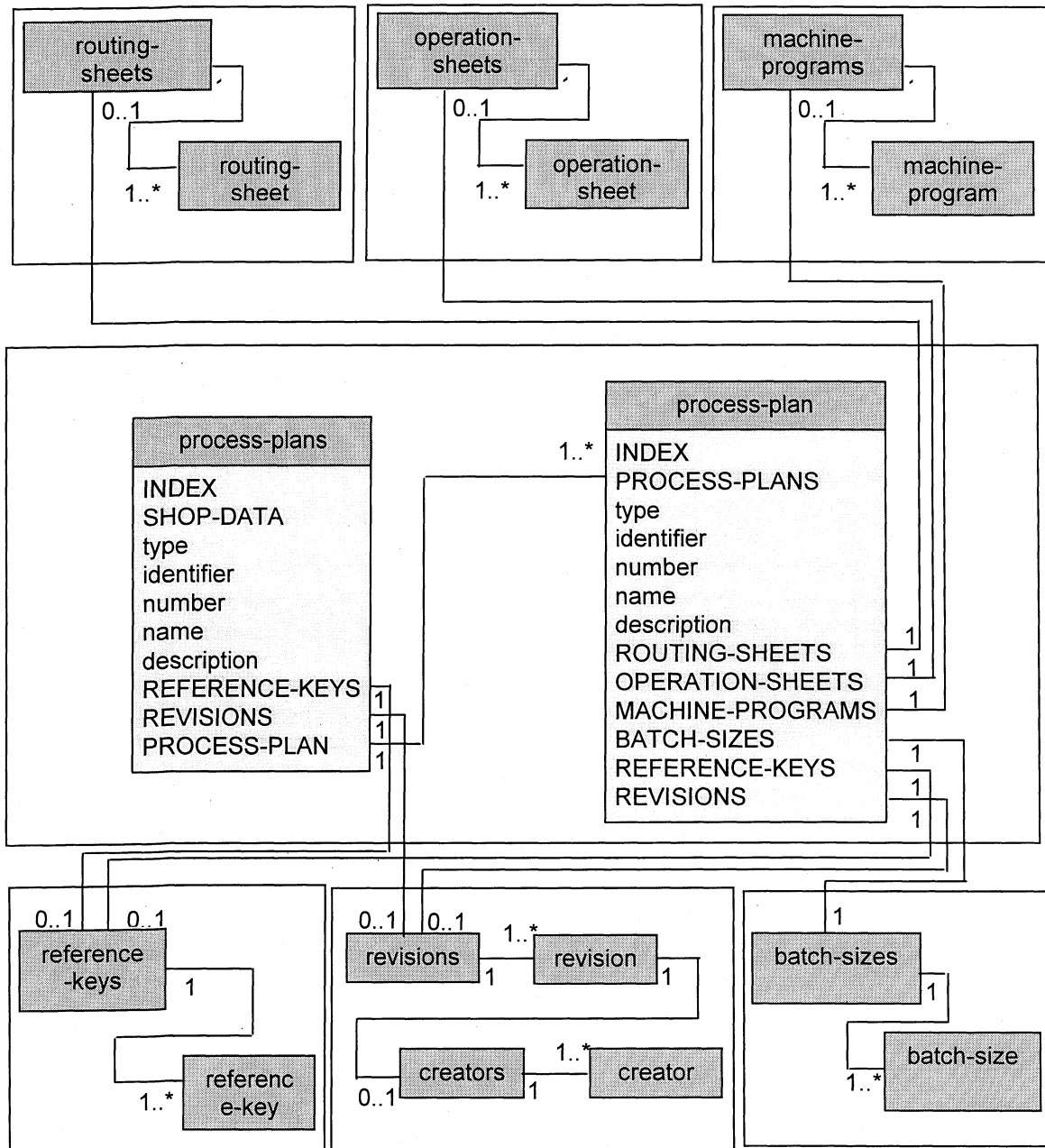


Figure C-14: *process-plans* and related tables

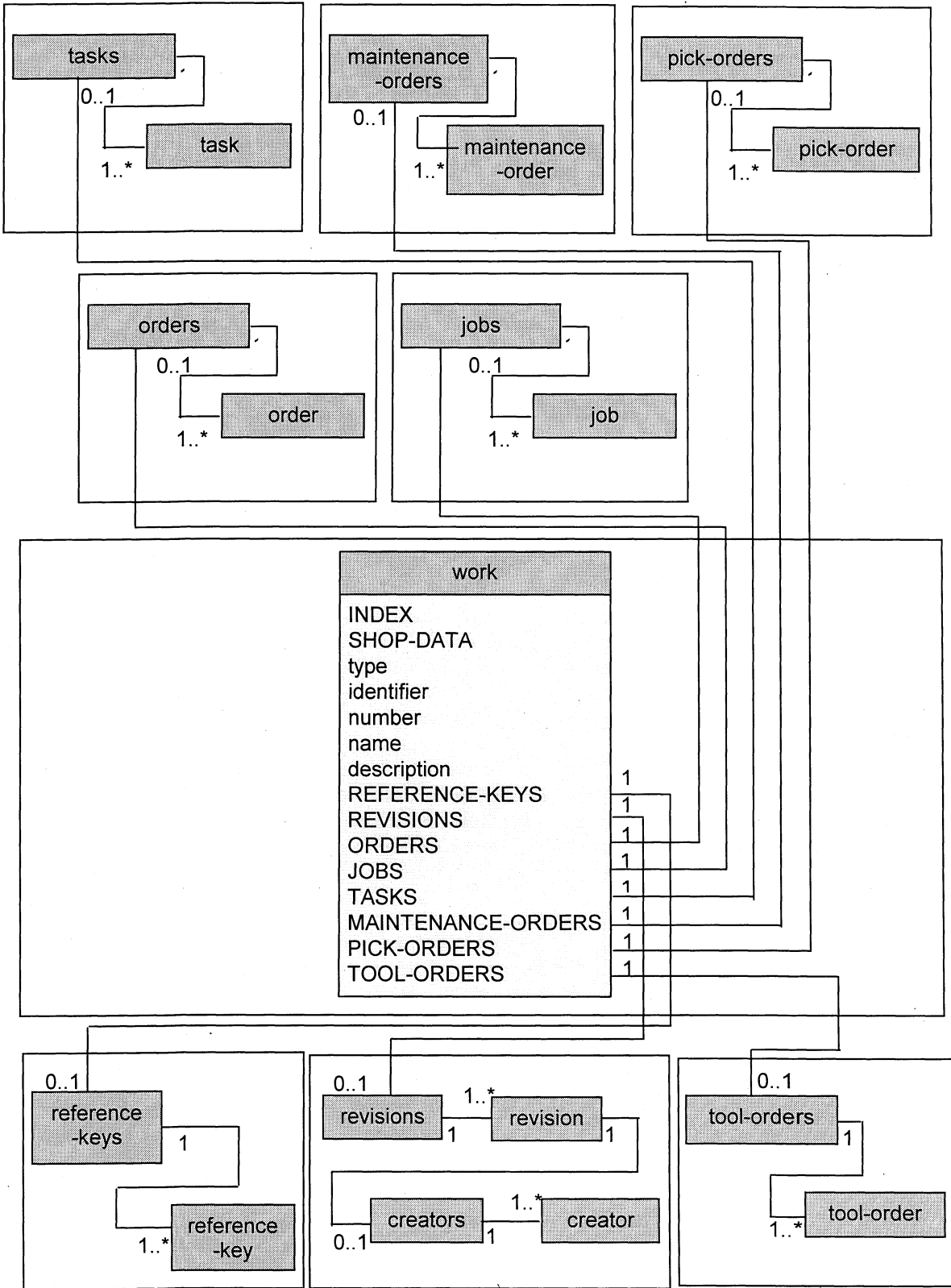


Figure C-15: *works* and related tables

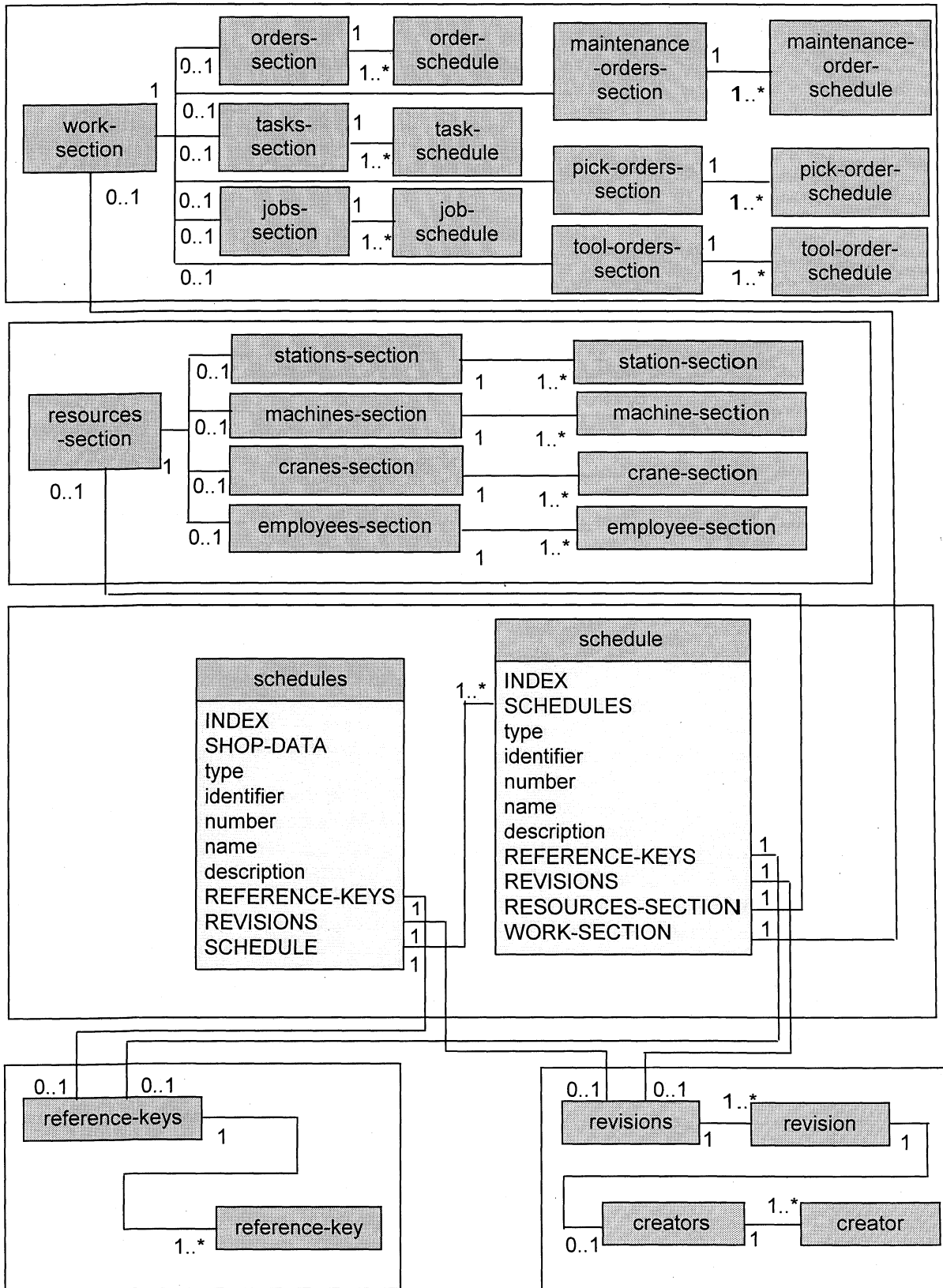


Figure C-16: *schedules* and related tables

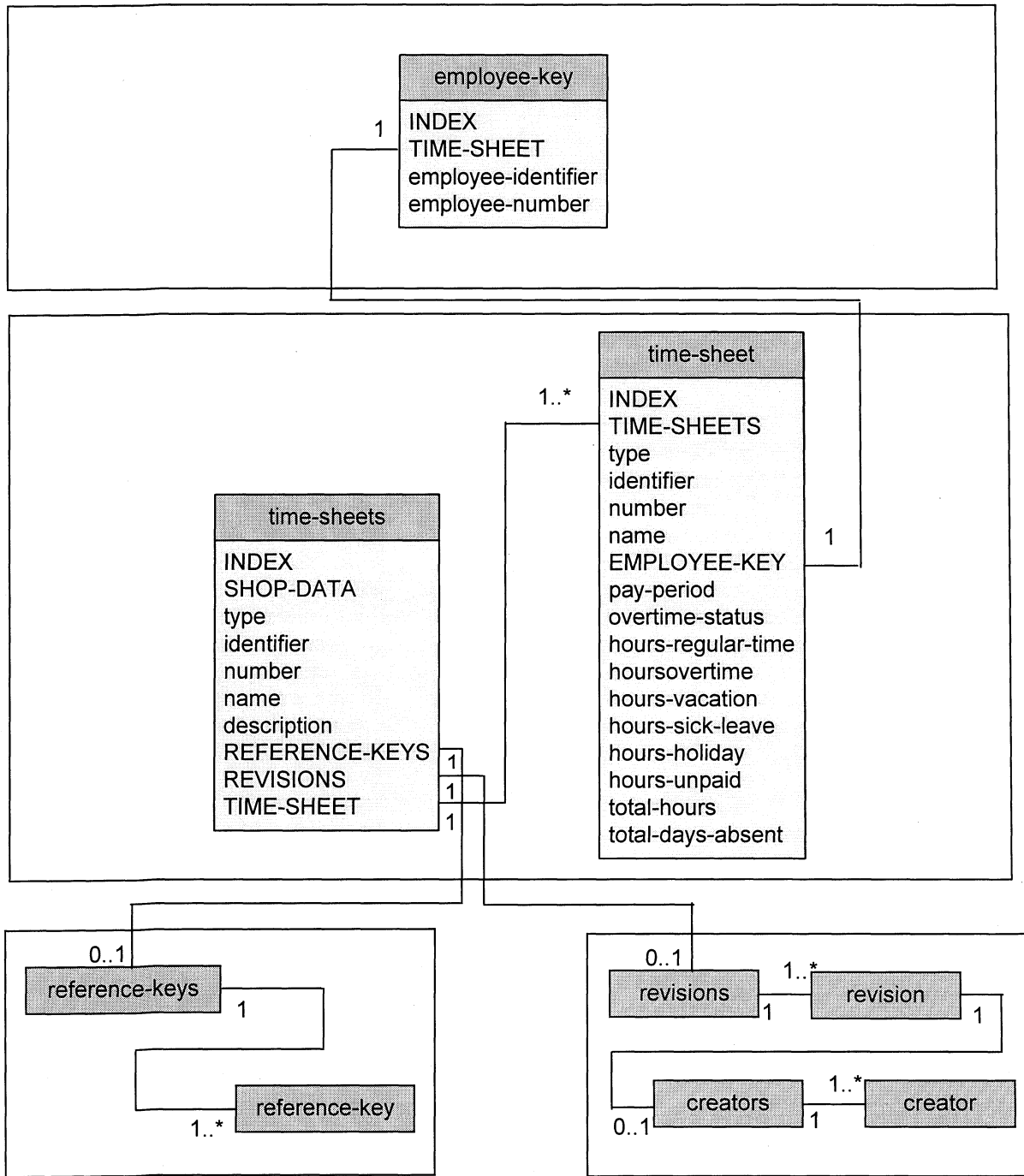


Figure C-17: *time-sheets* and related tables

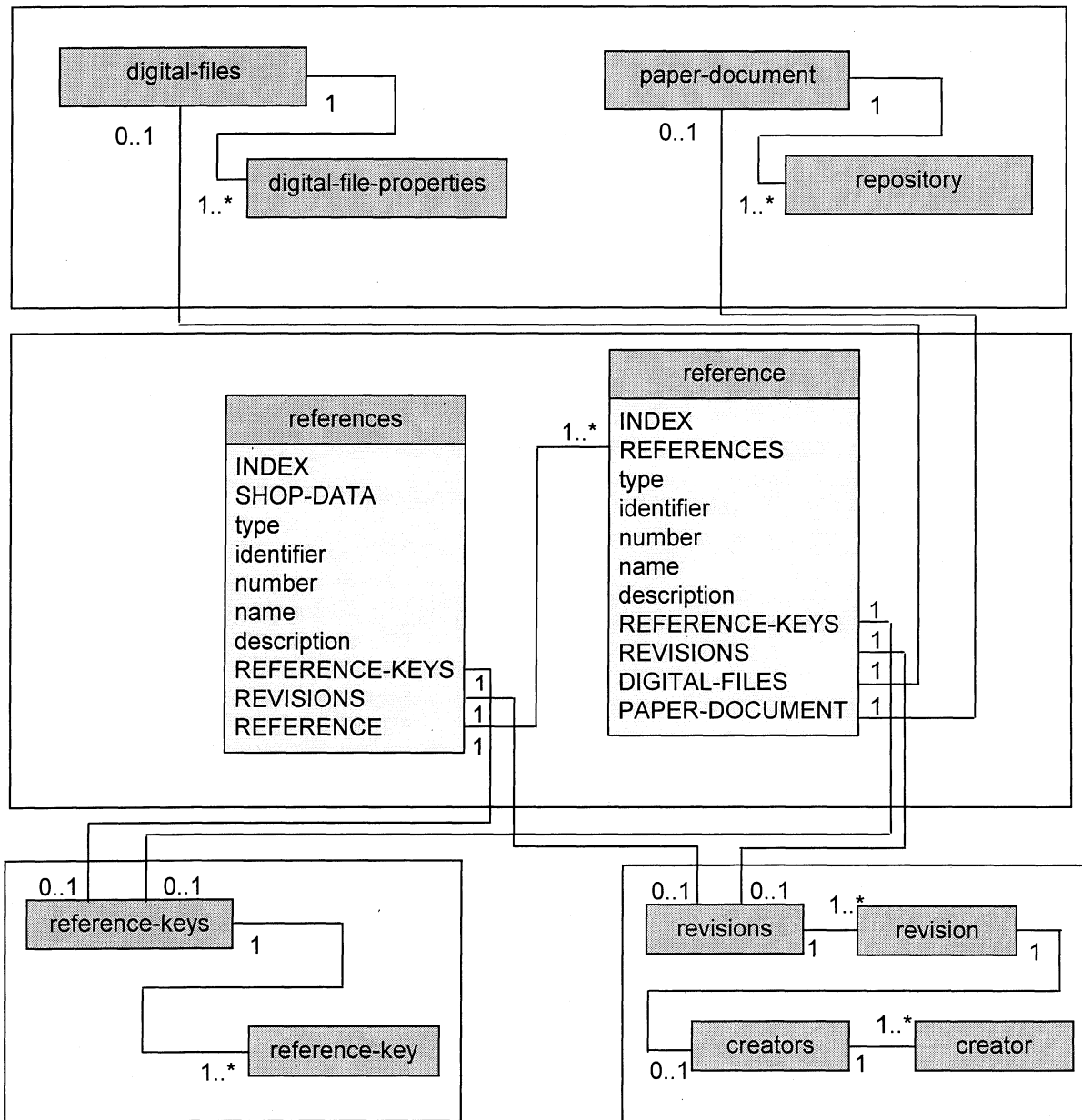


Figure C-18: *references* and related tables

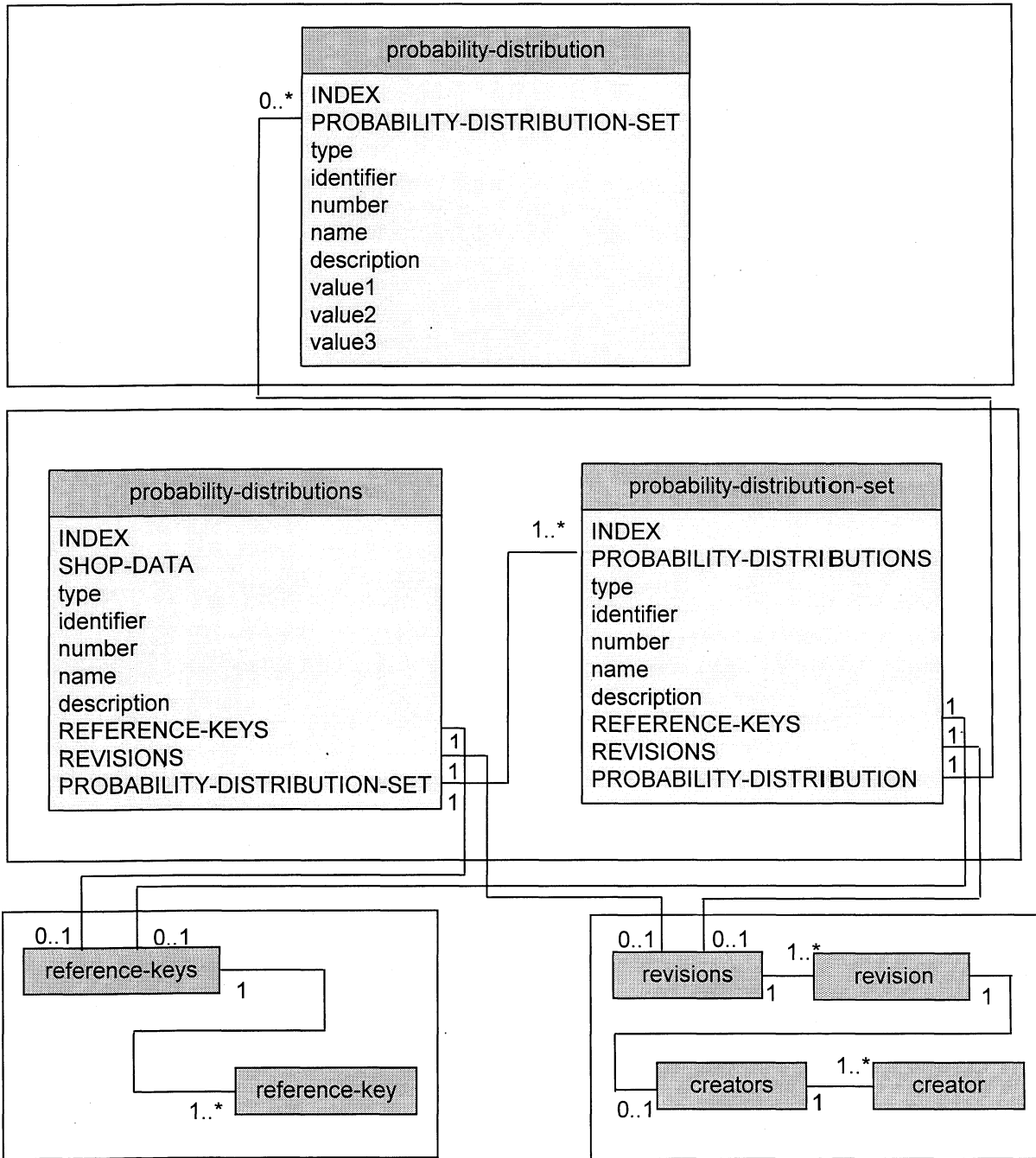


Figure C-19: *probability-distributions* and related tables

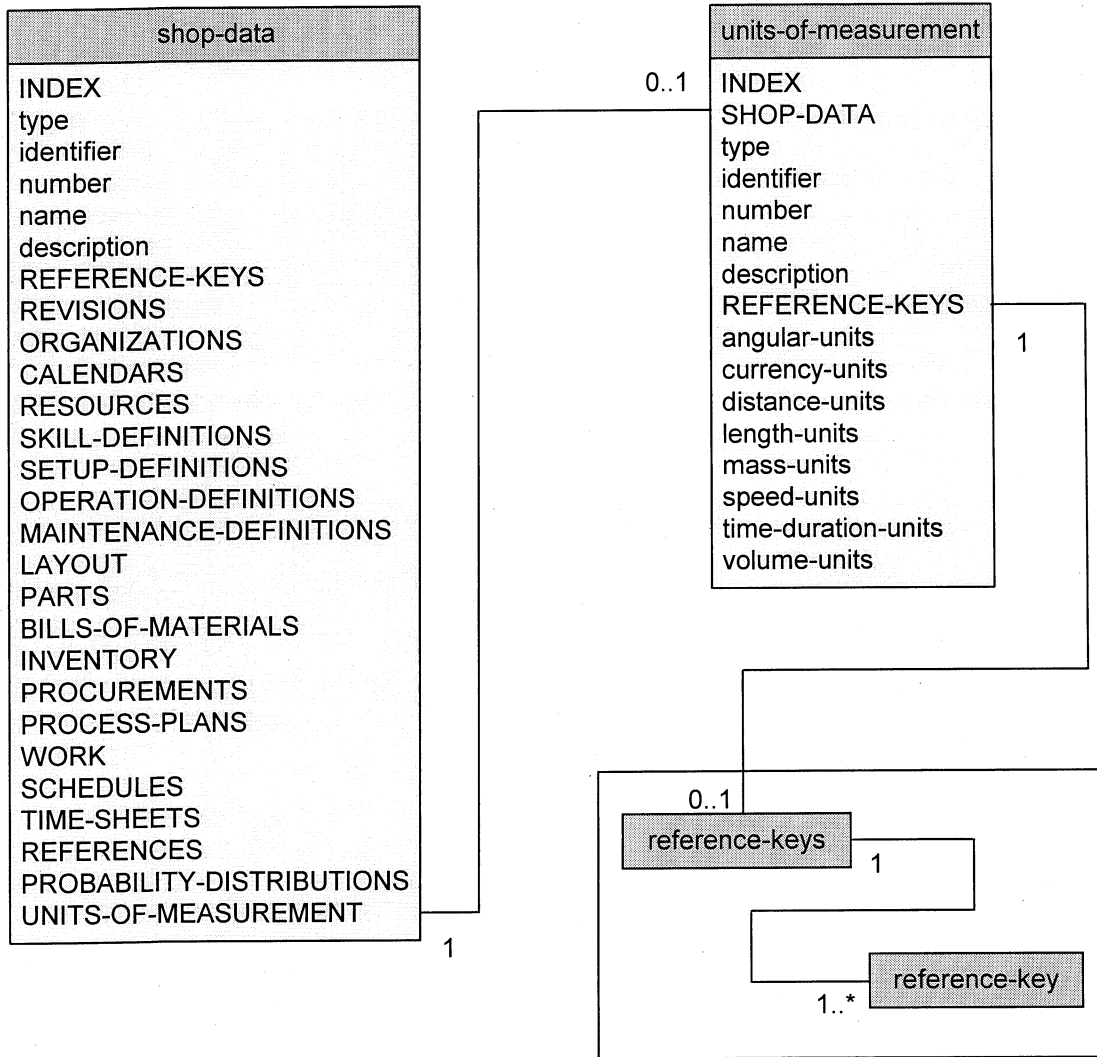


Figure C-20: *units-of-measurements* and related tables

Appendix D: Sample Data Tables

Table of shift-schedule

INDEX	CALENDAR	type	identifier	number	name	description	effective-start-date	effective-end-date	SHIFTS	HOLIDAYS
1	2002001	human-operated-machines-Fall2002	23201	human-operated-machines-Fall2002	human-operated-machines-Fall2002		2002-12-1	2002-12-31	2002101	2002201
2	2002001	automated-machines-Fall2002	23202	automated-machines-Fall2002	automated-machines-Fall2002		2002-12-1	2002-12-31	2002102	
3	2002001	human-specific-machines-Fall2002	23203	human-specific-machines-Fall2002	human-specific-machines-Fall2002		2002-12-1	2002-12-31	2002103	2002201
4	2002002	human-operated-machines-Winter2003	23204	human-operated-machines-Winter2003	human-operated-machines-Winter2003		2003-1-1	2003-3-31	2002103	2002202
5	2002002	automated-machines-Winter2003	23205	automated-machines-Winter2003	automated-machines-Winter2003		2003-1-1	2003-3-31	2002104	2002203
6	2002002	human-specific-machines-Winter2003	23206	human-specific-machines-Winter2003	human-specific-machines-Winter2003		2003-1-1	2003-3-31	2002103	2002202

Table of shift

INDEX	SHIFTS	type	identifier	number	name	start-time	end-time	duration	DAYS-OF-WEEK	BREAKS
1	2002301	one-of-two-shifts-five-day	23301	dms-one-of-two-shifts-five-days	dms-one-of-two-shifts-five-days	08:00:00	15:59:00	480	2002401	
2	2002301	two-of-two-shifts-five-day	23302	dms-two-of-two-shifts-five-days	dms-two-of-two-shifts-five-days	16:00:00	23:59:00	480	2002401	
3	2002302	three-shifts-seven-days	23303	dms-three-shifts-seven-days	dms-three-shifts-seven-days	00:00:00	23:59:00	1440	2002402	
4	2002303	one-shift-five-days	23304	dms-one-shift-five-days	dms-one-shift-five-days	08:00:00	15:59:00	480	2002401	
5	2002304	three-shifts-five-days	23305	dms-three-shifts-five-days	dms-three-shifts-five-days	00:00:00	23:59:00	1440	2002401	

shifts

INDEX	SHIFT-SCHEDULE	SHIFT
1	2002101	2002301
2	2002102	2002302
3	2002103	2002303
4	2002104	2002304