INTERNATIONAL STANDARD

ISO 15926-13

First edition
2018-08

Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities —

Part 13: Integrated asset planning life-cycle

Systèmes d'automatisation industrielle et intégration — Intégration de données de cycle de vie pour les industries de "process", y compris les usines de production de pétrole et de gaz —

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

Reference number
ISO 15926-13:2018(E)

© ISO 2018

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2018 – All rights reserved

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **2**

3 Terms, definitions, symbols and abbreviated terms **2**
3.1 Terms and definitions 2
3.2 Abbreviated terms 6
3.3 Symbols 7

4 Layers and extension of integrated asset planning life-cycle data **8**
4.1 Layers for integrated asset planning life-cycle data 8
4.2 The documentation of the layers 9
4.3 Use of the layers 10
4.4 Extensions for particular engineering applications 10
4.5 Simplification for a scheduling application view 10

5 Representation of planning data **12**
5.1 Basis of the approach 12
5.2 Fundamental planning objects 14
5.2.1 Objective of planning 14
5.2.2 Required or proposed activity and specification 15
5.2.3 Alternative specifications 17
5.3 Schedule 18
5.3.1 Definition of a schedule 18
5.3.2 Level of a schedule 19
5.3.3 Role of a schedule 20
5.4 Planning activity 21
5.5 Actual activity that fulfils a requirement 22
5.6 Decomposition of an activity 23
5.6.1 Parts of activities and their level 23
5.6.2 Decomposition of a specification 24
5.7 Classifications of an activity 25
5.7.1 Activity purpose and activity breakdown 25
5.7.2 Activity management objective 25
5.7.3 Asset life-cycle phase 26
5.7.4 Activity risk 27
5.7.5 Activity criticality 27
5.7.6 Activity priority 28
5.7.7 Activity completion status 28
5.7.8 Activity planning status 30
5.8 Resource for an activity 31
5.8.1 Specification of a resource 31
5.8.2 Resource breakdown 34
5.8.3 Available physical object for a resource 34
5.8.4 Quantity-based and time-based resources 34
5.8.5 Consumable material and equipment 35
5.8.6 Quantity base resource usage 35
5.8.7 Work centre and organizational level 37
5.8.8 Staff time and discipline 38
5.8.9 Consumption profile 39
5.8.10 Material resource availability checking and ordering 40
5.8.11 Material resource delivery 41
5.9 Participants in an activity 42
5.9.1 Subject of work 42

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.9.2 Subject of work and physical breakdown 44
5.9.3 Role of a person or organization 45
5.9.4 Planning software 46
5.10 Shutdown 46
5.10.1 Shutdown phase 46
5.10.2 Necessary shutdown for an activity 46
5.10.3 Shutdown scope 47
5.10.4 Shutdown reason 47
5.11 Dates and times for an activity 48
5.11.1 Beginning and end events for an activity 48
5.11.2 Required beginnings and ends 49
5.11.3 Required as early or as late as possible 50
5.11.4 Proposed beginnings and ends 51
5.11.5 Actual beginnings and ends 52
5.12 Duration of an activity 52
5.13 Measure of progress 54
5.13.1 Frontline date 54
5.13.2 Performance measurement 55
5.14 Event and milestone 56
5.15 Temporal relationships between activities and events 58
5.15.1 Succession relationship 58
5.15.2 Specified lag for a succession relationship 59
5.15.3 Specified lag with calendar for a succession relationship 61
5.15.4 Free float and total float for an activity in plan 62
5.15.5 Dependency relationship 63
5.16 Calendar 63
5.16.1 Working days 63
5.16.2 A repeating period in time 64
5.16.3 A repeating point in time 66
5.17 Identification of objects 66
5.18 Work order 67
5.19 Area of facility and site 67

6 Scheduling application view 67
6.1 Use of the scheduling application view model 67
6.2 Simplification of the ISO 15926 ontology 68
6.3 An actual activity in the scheduling application view model 69
6.4 Data planning for the scheduling application view 71
6.5 User defined properties in the scheduling application view 79

Annex A (normative) **Ontology for integrated asset planning life-cycle 81**

Annex B (normative) **XML schema for exchange between scheduling applications 85**

Annex C (informative) **Relationship between the planning ontology and the scheduling application interface 86**

Annex D (informative) **Schedule and activity level 88**

Annex E (informative) **Interface to reference data libraries 90**

Annex F (informative) **Usage scenarios 93**

Annex G (informative) **Relationship with UN/CEFACT XML schema for reporting project schedule and cost performance 95**

Bibliography 96

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

Foreword

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

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

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

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

A list of all parts in the ISO 15926 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

Introduction

ISO 15926 is an International Standard for the representation of process industries facility life-cycle information. This representation is specified by a generic, conceptual ontology that is suitable as the basis for implementation in a shared database or data warehouse. This ontology is defined in ISO 15926-2, and has an OWL (Web Ontology Language) representation defined in ISO/TS 15926-12. ISO 15926-2 and ISO/TS 15926-12 are intended to be used as a foundation for domain specific extensions defined in other parts of ISO 15926.

The ontology is designed to be used in conjunction with reference data, i.e. standard instances that represent information common to a number of users, production facilities, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the ontology.

This document specifies an extension to the generic, conceptual ontology to support integrated planning for assets throughout their life-cycle. The ontology enables the integration of planning data from different sources within a company database.

The ontology is represented in OWL. This document also specifies an XML schema definition (XSD) for a machine-readable exchange of data used for asset planning.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities —

Part 13: Integrated asset planning life-cycle

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

1 Scope

This document specifies an ontology for asset planning for process plants, including oil and gas production facilities. In addition, it specifies an XML schema, derived from the ontology, for exchange of data used for asset planning.

The following are within the scope of this document:

— portfolio, programme and project plans and schedules;

— operational modification and ongoing maintenance plans and schedules;

— calendars for plan execution;

— constraints on the temporal relationships between items within plans and schedules, including succession link, lag, free and total float;

— activity breakdown structures;

— locations of activities;

— resources required, including material, equipment and human resources, and their costs;

— interfaces to systems that process work orders and purchase orders;

— responsible organizations and people;

— progress tracking and resource usage;

— reference to standard classes of facility, activity and resource.

EXAMPLE Standard classes are defined in ISO 19008.

The following are outside the scope of this document:

— standard classes of facility, activity and resource;

NOTE ISO 19008 contains such standard classes.

— production planning;

— plan simulation and optimization;

— hazard identification and risk analysis;

— manning and training of personnel;

— budgeting and cost allocation.

© ISO 2018 – All rights reserved

2 Normative references

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

ISO/TS 15926-12:2018, *Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities — Part 12: Life-cycle integration ontology*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 15926-12 and the following apply.

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

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

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

3.1.1
activity
individual that is something happening or changing

Note 1 to entry: The ISO/IEC/IEEE 15288:2015 definition of "activity" as "set of cohesive tasks of a process" implies a hierarchy in which processes contain activities, and activities contain tasks. Within this document, all are activities.

Note 2 to entry: The definition in the PMI Lexicon of Project Management Terms states that "activity" is an element of work performed during the course of a project. An activity normally has an expected duration, an expected cost, and expected resource requirements. Activities can be subdivided in tasks.

[SOURCE: ISO/TS 15926-12:2018, 3.1.1, modified — Notes to entry have been added.]

3.1.2
asset planning
planning that is for the construction, commissioning, refurbishment, maintenance, decommissioning, and disposal of assets, including the running down and starting up of production by assets

3.1.3
baseline schedule
schedule that is used by a planning activity as a reference basis for comparison to monitor and control progress on the planned activity

Note 1 to entry: The PMI Lexicon of Project Management Terms defines baseline schedule as "the approved version of a schedule model that can be changed using formal change control procedures and is used as the basis for comparison to actual results".

Note 2 to entry: A baseline schedule is a specialization of the ISO/IEC/IEEE 15288:2015 definition of "baseline" as "formally approved version of a configuration item, regardless of media, formally designated and fixed at a specific time during the configuration item's life-cycle".

[SOURCE: ISO 21500:2012, 2.3, modified]

3.1.4
calendar
pattern of working days and shifts that are available for scheduled activities

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

3.1.5
current schedule
schedule of the planned activity that is currently specified as the agreed working schedule by a planning activity to the performer of the planned activity

Note 1 to entry: ISO 21500:2012 specifies that the role of a current schedule is to avoid adverse schedule impact.

3.1.6
decision gate
activity that approves continuation

Note 1 to entry: Continuation of work beyond a decision gate is contingent on the agreement of the decision-makers.

Note 2 to entry: Criteria for continuation of abandonment are established for each decision gate.

3.1.7
early finish
earliest possible point in time when the uncompleted portions of the activity can finish based on the schedule

[SOURCE: PMI Lexicon of Project Management Terms]

3.1.8
early start
earliest possible point in time when the uncompleted portions of the activity can start based on the schedule

[SOURCE: PMI Lexicon of Project Management Terms]

3.1.9
finish to finish
successor relationship in a plan that is from the finish of one activity to the finish of the next

3.1.10
finish to start
successor relationship in a plan that is from the finish of one activity to the start of the next

3.1.11
free float
period of time into which an activity in a plan can overrun without causing a delay to subsequent activities in the plan

3.1.12
frontline date
date on which the achieved progress on an activity was scheduled

3.1.13
lag
period in time that is specified for a plan succession link

Note 1 to entry: This corresponds to the attributes “lead” and “lag” which are defined in ISO 21500:2012.

3.1.14
late finish
latest point in time that an activity can finish based on the schedule

3.1.15
late start
latest point in time that an activity can start based on the schedule

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

3.1.16
live schedule
schedule that has been revised from the current schedule to mitigate any delays

3.1.17
managed programme of work
activity that contains management and planning for the whole

3.1.18
milestone
event that is significant in a project, programme of work, or portfolio

[SOURCE: PMI Lexicon of Project Management Terms]

3.1.19
ontology
formal statement of an understanding of the world

Note 1 to entry: An ontology can be represented in any language. It need not be represented in a language specifically designed for ontologies, such as OWL. An ontology can have different representations.

Note 2 to entry: An ontology does not specify what data need to be recorded about the world.

Note 3 to entry: The ontology defined by this document is principally concerned with the world outside a computer system.

[SOURCE: ISO/TS 15926-12:2018, 3.1.3]

3.1.20
plan
specification of how an activity will be done

Note 1 to entry: A plan can include the following:

— a breakdown into component activities;

— resources required by component activities;

— durations of component activities;

— required dates for milestones;

— succession relationships and lags between component activities;

— calendars for activities, resources and lags;

— start and end dates for component activities.

Note 2 to entry: An unscheduled plan does not contain start and end dates for component activities. A schedule does contain start and end dates for component activities.

Note 3 to entry: Plan corresponds to the term design (noun) defined in ISO/IEC/IEEE 15288:2015, where the design is for an activity rather than for a system or system element.

Note 4 to entry: A plan can be more or less detailed.

Note 5 to entry: The PMI Lexicon of Project Management Terms defines “project management plan” as “the document that describes how the project will be executed, monitored and controlled, and closed.”

3.1.21
plan succession link
succession relationship between one activity or milestone and the next in a plan

Note 1 to entry: A plan succession link has the attributes “lead” and “lag” which are defined in ISO 21500:2012.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

3.1.22
planning
activity that is creating a plan

Note 1 to entry: Planning corresponds to the term design (verb) defined in ISO/IEC/IEEE 15288:2015, where a plan for an activity, rather than a design for a system or system element, is created.

3.1.23
project
activity with defined start and finish criteria undertaken to create a product or service in accordance with specified resources and requirements

Note 1 to entry: A continuing operational activity is not a project.

Note 2 to entry: A project has a beginning and end, and can be constrained by available time, funding and resources.

Note 3 to entry: In many cases an activity that is planned consists of parts of different projects with different objectives. Therefore the activity is not a project.

Note 4 to entry: Product here is a result of the project activity, not directly related to Product Breakdown Structure.

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.33, modified — The word "endeavour" has been replaced with "activity" at the start of the definition and the Notes to entry have been modified.]

3.1.24
resource
individual that is used to perform an activity

Note 1 to entry: A resource can be material or staff time or equipment.

3.1.25
revised schedule
schedule that has been revised from the current schedule

3.1.26
revision shutdown
shutdown that is in order to make a change to a production activity

3.1.27
schedule
specification of an activity that contains all that is required as a basis for execution, and that specifies start and end dates for component activities

Note 1 to entry: A schedule is the end product of a planning activity at a point in time. A schedule can be revised as a project progresses.

Note 2 to entry: A schedule includes calendars, succession relationships, and all other constraints.

3.1.28
standard class
class whose specification for membership is owned or controlled by a standardization body and is publicly available

[SOURCE: ISO 15926-1:2004, 3.1.2, modified — The Note to entry and examples have been deleted.]

3.1.29
start to finish
successor relationship in which a successor activity cannot finish until a predecessor activity has started

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

3.1.30
start to start
successor relationship in which a successor activity cannot start until a predecessor activity has started

3.1.31
subject of work
physical object that an activity is carried out upon

3.1.32
total float
period of time into which an activity in a plan can overrun without causing a delay to the completion of the plan as a whole

3.1.33
work order
managed programme of work that contains a request from one party to another for one or more activities to be performed

3.2 Abbreviated terms

COR	Code Of Resources
EF	Early Finish
ES	Early Start
FF	Finish to Finish
FNET	Finish No Earlier Than
FNLT	Finish No Later Than
FS	Finish to Start
LF	Late Finish
LS	Late Start
MFO	Must Finish On
MSO	Must Start On
OMG	Object Management Group
OWL	Web Ontology Language
PBS	Physical Breakdown Structure
RDF	Resource Description Framework
RDL	Reference Data Library
SAB	Standard Activity Breakdown
SAWSDL	Semantic Annotations for WSDL and XML Schema
SF	Start to Finish
SKOS	Simple Knowledge Organization System
SNET	Start No Earlier Than

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

SNLT	Start No Later Than
SS	Start to Start
TURTLE	Terse RDF Triple Language
UML	Unified Modeling Language
IRI	Internationalized Resource Identifier
UTC	Coordinated Universal Time
W3C	The World Wide Web Consortium
XML	eXtensible Mark-up Language
XSD	XML Schema Definition

3.3 Symbols

This document contains examples with diagrams which show instantiations of ISO 15926. The concise notation is used for these diagrams as defined in Figure 1.

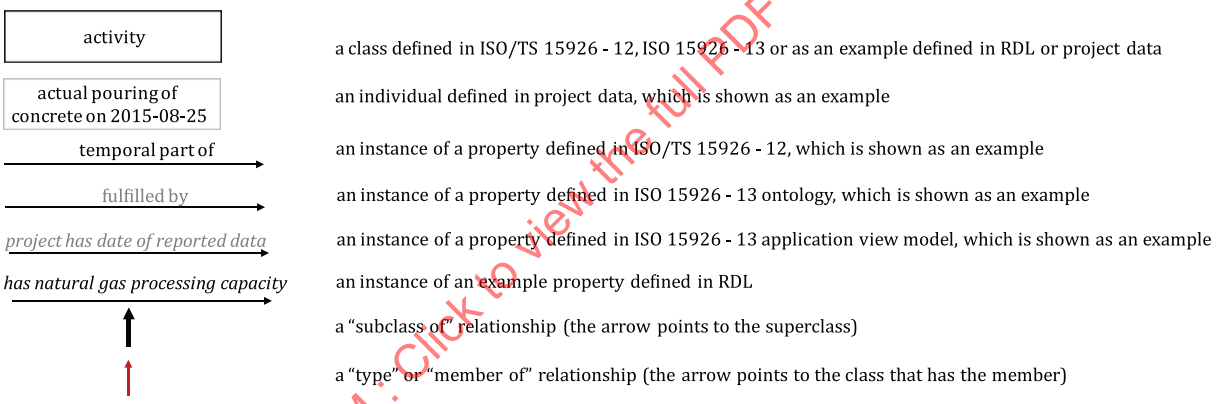

Figure 1 — Notation for the ISO 15926 instantiation examples

NOTE ISO/TS 15926-12 implements the ISO 15926-2 entity **composition of individual** by the OWL object properties **lci:hasPart** and **lci:partOf**. ISO/TS 15926-12 partially implements the ISO 15926-2 entity **class of composition of individual** by the OWL object properties shown in Figure 2.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

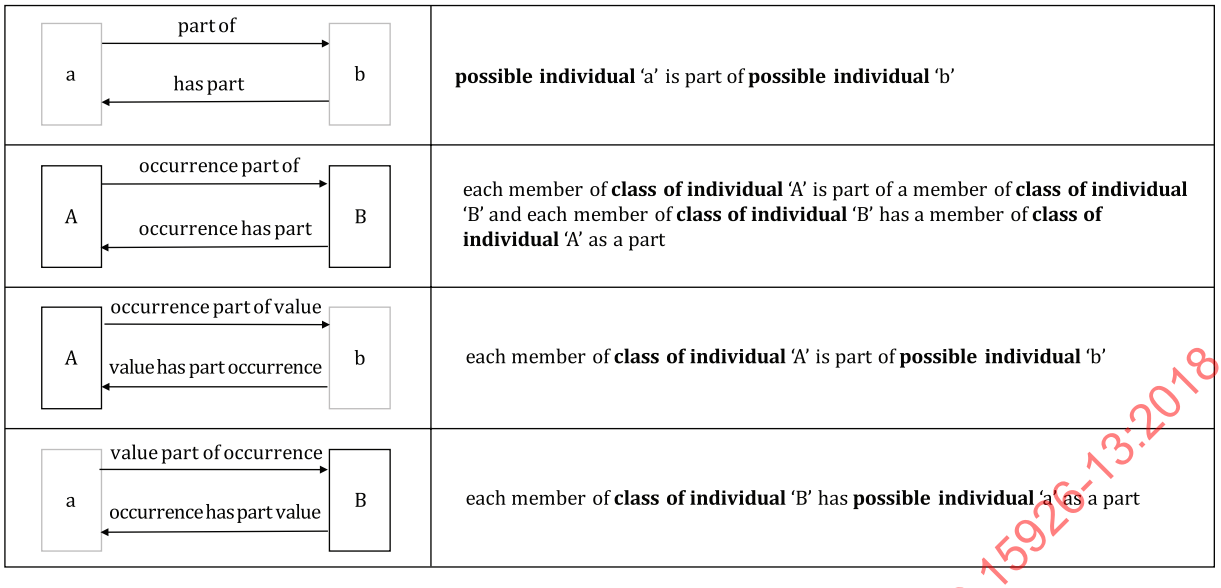

Figure 2 — Naming convention for composition and class of composition

The naming convention is used as follows:

— the **activity** 'actual pouring of concrete for the refurbishment of facility F-101' has **part of** relationship with the **activity** 'actual refurbishment of facility F-101';

— the **plan for activity** (a class) 'plan for pouring of concrete for the refurbishment of facility F-101 version 2' has an **class part of occurrence** relationship with the **plan for activity** 'plan for the refurbishment of facility F-101 version 2'.

The use of the composition properties is shown in Figure 3.

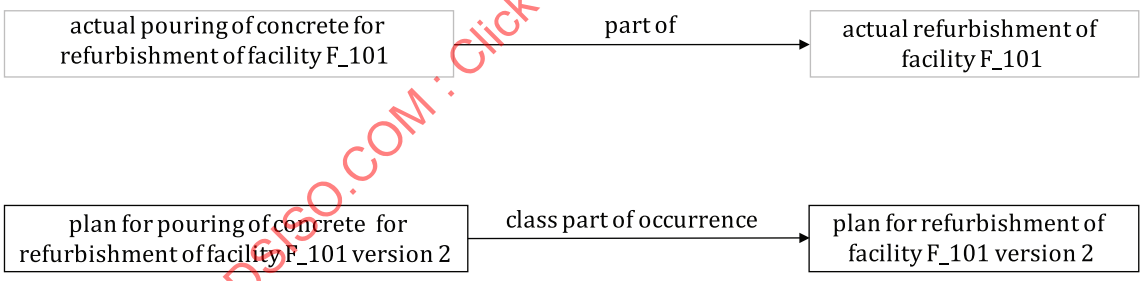

Figure 3 — Use of composition properties

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

4 Layers and extension of integrated asset planning life-cycle data

4.1 Layers for integrated asset planning life-cycle data

The approach to integrated asset planning life-cycle data defined by this document has the layers shown in Figure 4.

© ISO 2018 – All rights reserved

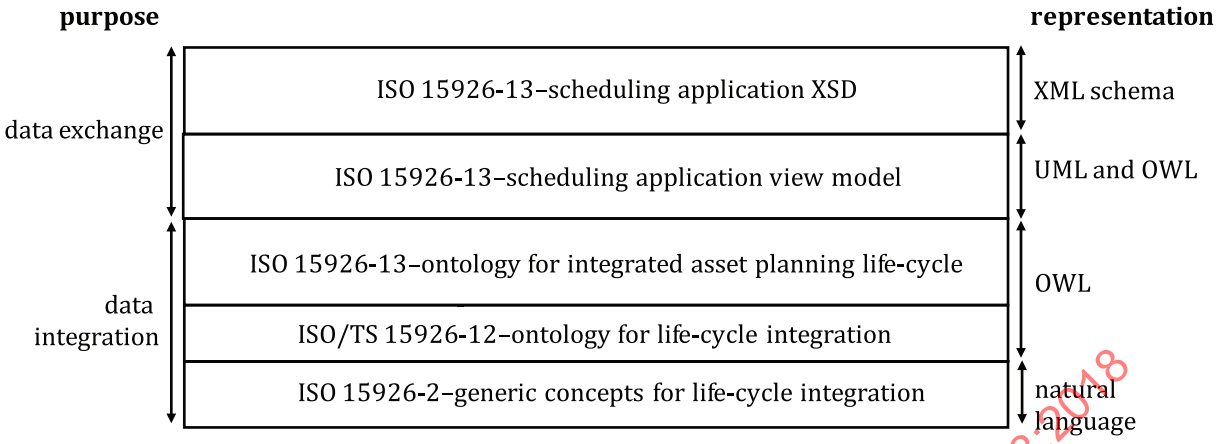

Figure 4 — Layers for integrated asset planning life-cycle

These layers are as follows:

— ISO 15926-2 defines the concepts that support the representation of engineering data throughout its life-cycle;

— ISO/TS 15926-12 represents the concepts defined in ISO 15926-2 using OWL;

— the ontology in this document imports ISO/TS 15926-12 and extends it with additional concepts required for planning.

This ontology can be used to define a database of planning data.

— The scheduling application view model in this document defines an external view of planning data that is appropriate for scheduling applications. This view model has a limited scope with a defined set of properties.

  The view model is expressed as UML diagrams, and in a scheduling application view ontology. This view ontology defines classes with epistemological constraints and template properties that hide objects which are not part of the view.

— The scheduling application XML schema in this document defines a physical file format for exchange between scheduling applications or between a scheduling application and a database of planning data. The XML schema is derived by algorithm from the OWL representation of the scheduling application view model.

4.2 The documentation of the layers

The documentation of the layers, starting at the bottom of Figure 4, is as follows.

— **Ontology for integrated asset planning life-cycle**: The planning ontology is described in Clause 5. Implementation of the planning ontology in OWL shall use the representation of the ontology in Clause A.1.

  NOTE 1 This clause contains numerous examples.

— **Scheduling application view model**: The scheduling application view is described in Clause 6. Implementation of the scheduling application view in OWL shall use the representation of the ontology in Clause A.3.

  NOTE 2 Although the scope of the ontology within this document is greater than that of the view, this clause can serve as an introduction to this document as a whole. The data planning diagrams in 6.4 are especially useful as an introduction.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

The template properties that hide objects which are not part of the view in the scheduling application view are listed in Clause 6. The OWL ontology for the scheduling application view is on the Web with a link in Clause A.3.

— **Scheduling application XML schema**: The scheduling application XML schema is derived from the scheduling application view ontology. The representation of planning data in XML for exchange with a scheduling application shall use the XML schema in Annex B.

4.3 Use of the layers

The layers are used as follows:

— **exchange of data**: Data can be exchanged as a document using the scheduling application XML schema, or as a serialization of data recorded using the scheduling application view model ontology.

NOTE 1 Possible serializations formats for data recorded using the ontology include TURTLE and JSON.

— **sharing of data**: Data can be shared by database implementations of the ontology for integrated asset planning life-cycle.

NOTE 2 Data recorded using the ontology can be held in a triple store.

NOTE 3 Usage scenarios are discussed in Annex F.

4.4 Extensions for particular engineering applications

The classes and relationships defined in ISO 15926-2 and this document may be extended for particular engineering applications.

NOTE 1 Extensions can be defined in other standard or community ontologies. The interfaces to reference data libraries are listed in Annex E.

EXAMPLE 1 ISO/TS 15926-4 defines "meter" and "pump", which are specializations of the generic class "physical object" defined in ISO 15926-2. The class "pumping equipment" is an extension, which is defined in ISO 19008.

For an OWL implementation of this document, an extension for a particular engineering application may be contained in an imported ontology that has been integrated with ISO 15926 in accordance with ISO/TS 15926-6.

NOTE 2 Extensions for the process industry defined in ISO/TS 15926-4 are already integrated with ISO 15926. Extensions defined in other standards will need to be integrated with ISO 15926 by the user. Quality requirements for the integration of an ontology that extends ISO 15926 are defined in ISO/TS 15926-6.

EXAMPLE 2 ISO TS/15926-6 requires that each class is a subclass of a class defined within ISO 15926-2. This give a basic level of quality. An imported ontology for human resources has the classes "stress engineer", "piping engineer", and "instrumentation engineer". Integration would make these classes subclasses of **person**. This would prevent incorrect use of these classes to classify a member of **activity** or **inanimate physical object**, because these classes are disjoint with **person**.

For an XML implementation of this document, a class or property that is an extension for a particular engineering application may be referenced as an **identified object**.

NOTE 3 An identified object can be identified by an IRI that provides a link to a reference data library. Alternatively can be merely given a label and text description.

4.5 Simplification for a scheduling application view

The scheduling application view model is a representation of the data at a particular instant in time.

NOTE The view model is a simplification of the full ontology for the integration of life-cycle asset planning, which has been obtained by removing objects that are needed to record how data changes with time.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

Two instantiations of the scheduling application view model for different times cannot be merged unless the data is transformed into a representation according to the full ontology for the integration of asset planning life-cycle. This is because the objects that distinguish between the different times are not part of the view model.

The scheduling application view model contains template view properties which:

— impose epistemological constraints to ensure that the data is complete for a scheduling application;

— hide objects in the ontology for the integration of life-cycle asset planning that are unnecessary for the scheduling application.

EXAMPLE A required **activity** has the template view property **activity has actual current percentage complete**. The **activity** "pouring of concrete for refurbishment of facility F_101" has a percentage complete of 50 % on 2015-11-05T18:00 and of 80 % complete on 2015-11-06T18:00. These two different percentages complete can be recorded in two different instantiations of the scheduling application view model. A single instantiation of the scheduling application view model is shown in Figure 5.

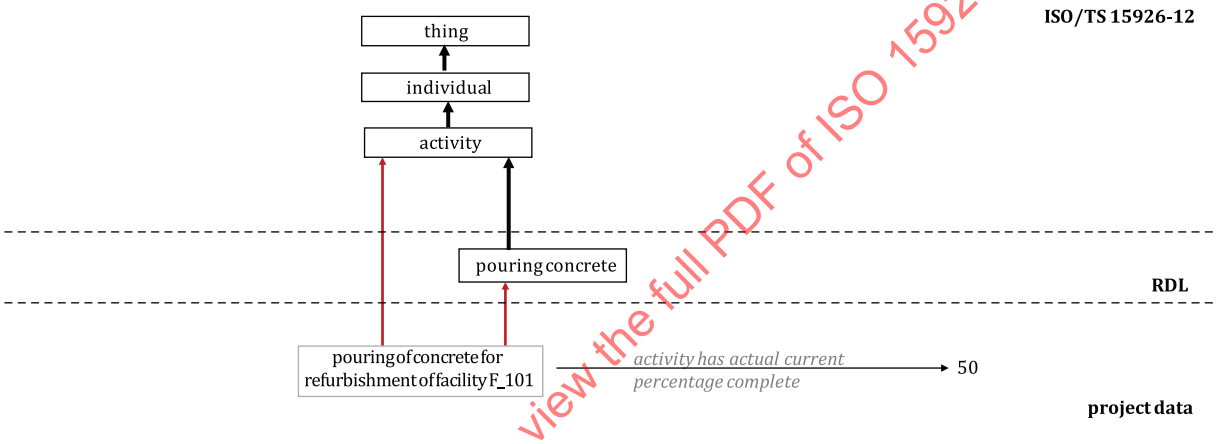

Figure 5 — An instantiation of the scheduling application view model

In order to record the two percentages complete within a single database, it is necessary to use the full ontology. The full ontology records that the required **activity** "required pouring of concrete for refurbishment of facility F_101" specified in the **schedule** is realized by an actual **activity** "actual pouring of concrete for refurbishment of facility F_101" which has different temporal parts terminating at 2015-11-05T18:00 and 2015-11-06T18:00 with different percentages complete. This is shown in Figure 6.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

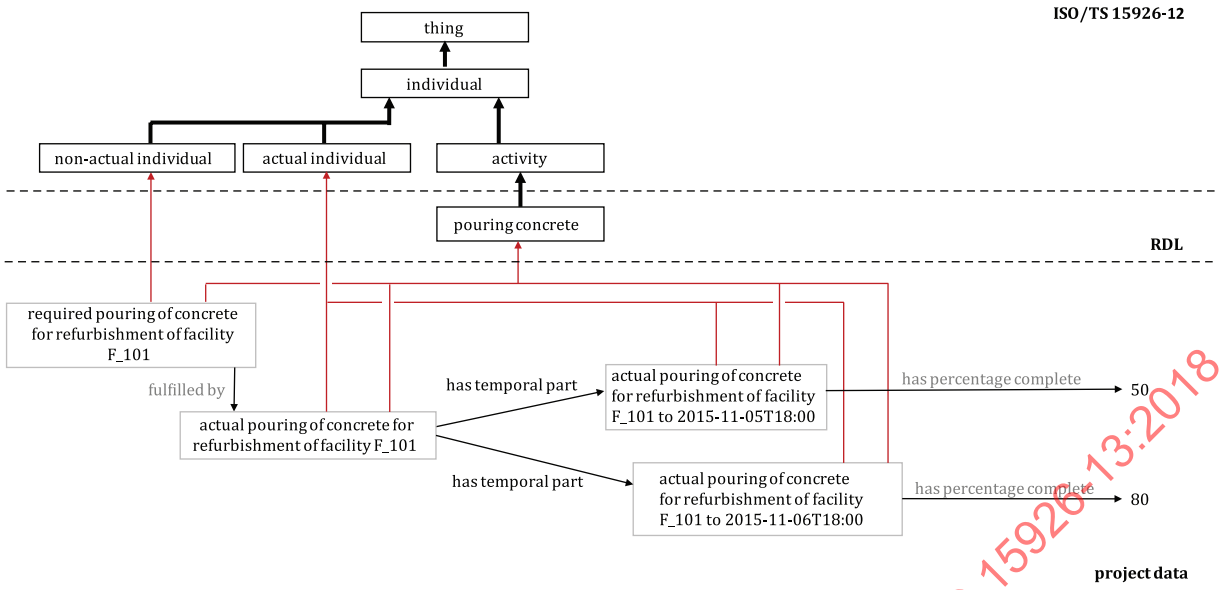

Figure 6 — Percentage complete changes with time

5 Representation of planning data

5.1 Basis of the approach

Planning data is about intended **activities** and their **specifications**, and about the recording of progress on the actual **activities** that fulfil the required **activities**.

The **specification** for a required activity has versions. A version of a **specification** is contained within a **schedule**.

The **specification** for a required **activity** specifies its parts, the interrelationships between the parts and the **resources** for the **activities**.

EXAMPLE The required **activity** "refurbishment of facility F-101" is defined by **specification** "specification for the refurbishment of facility F-101 version 2". This **specification** is contained within the **schedule** "schedule for the refurbishment of facility F-101 version 2.3".

The required **activity** "intended refurbishment of facility F-101" has the required parts "intended construction of foundations for refurbishment of facility F-101" and "required erection of steelwork for refurbishment of facility F-101". These part **activities** have **specifications** which are parts of the **specification** of the whole.

The objects and relationship are shown in Figure 7.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

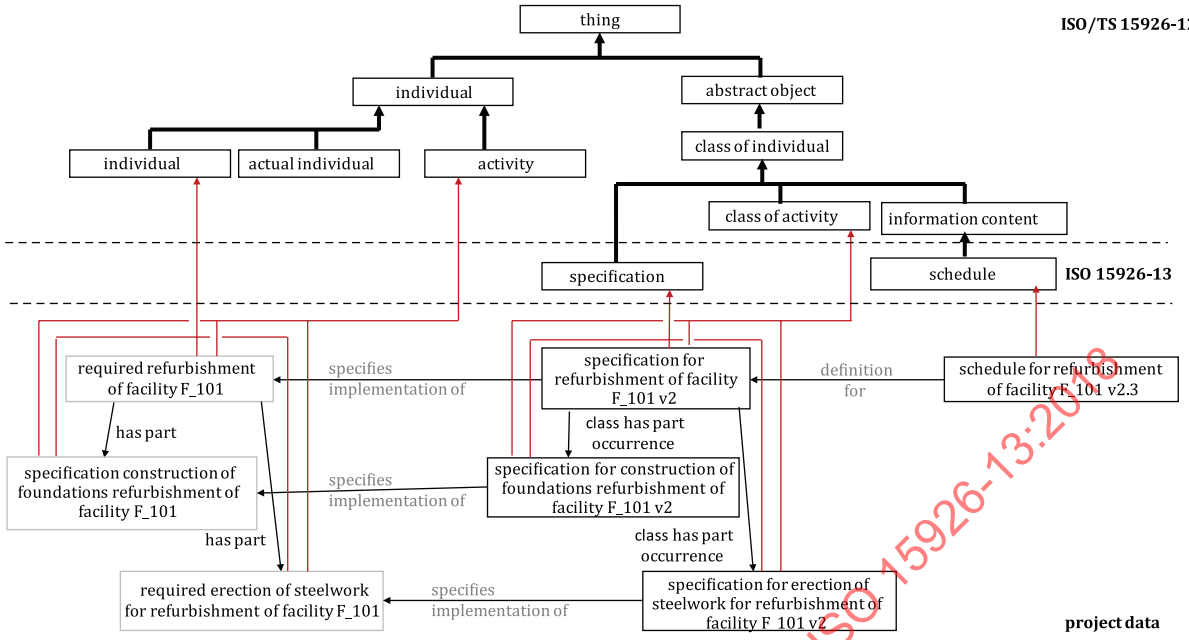

Figure 7 — Required activity, specification and parts

In Figure 7, the subclass relationships between the **specifications** and the class **activity** are not shown. The relationship **specifies implementation of** states that a proposed implementation of the requirement is a member of the class. The proposed implementation can be recorded explicitly if required, as shown in Figure 8.

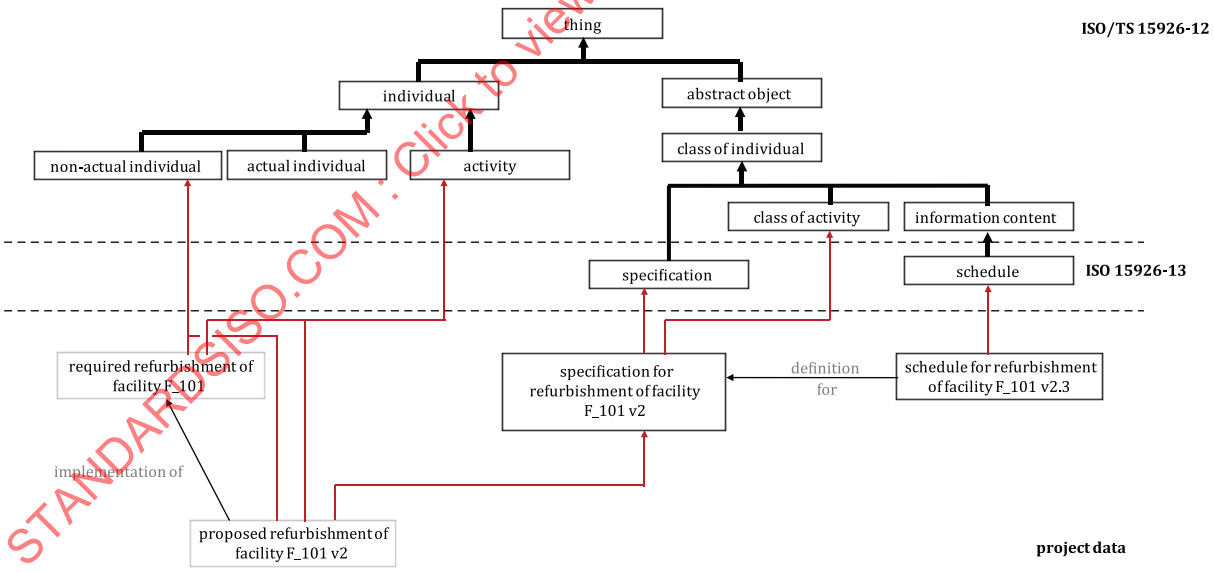

Figure 8 — Required activity, proposed implementation and specification

A single required **activity** may have different **specifications** contained in different **schedules**. Specifications may be updated as the actual **activity** that fulfils the requirement progresses.

An actual **activity** may be performed in accordance with a **specification**. This is shown in Figure 9.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

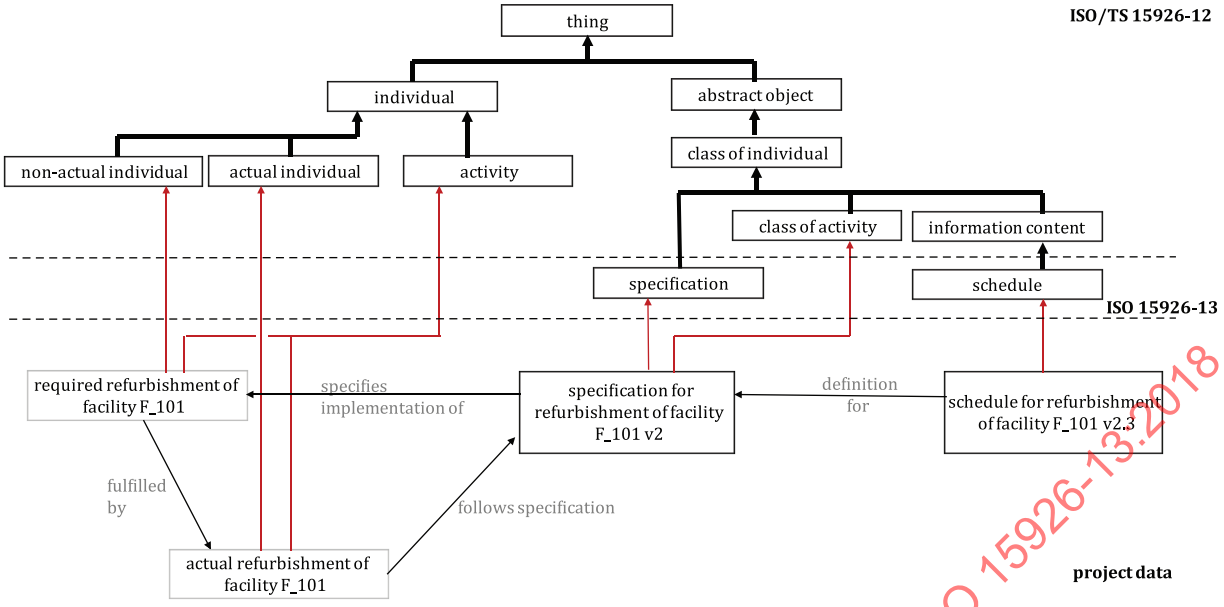

Figure 9 — Required activity, actual activity and specification

5.2 Fundamental planning objects

5.2.1 Objective of planning

A **planning** activity begins with a required **individual**. The required **individual** is something that is required to exist in the future. The **planning** is intended to define and control an **activity** that creates it.

NOTE The required **individual** is usually a **physical object**. It can be a new **physical object** or a new state of an existing **physical object**.

EXAMPLE UG Oil wishes to upgrade the existing natural gas processing system on platform UGE-1 from a capacity of 100 million ft^3 per day to a capacity of 180 million ft^3 per day.

UGE-1 with the increased capacity is a required future state. There is a required future upgrade activity that is intended to create this state. There is a **planning** activity that has the required future state as its objective.

The objects that record the required future state, the required **activity** to create it, and the **planning** activity are as follows:

— 'UGE-1': a **whole life asset** and **actual individual**;

— 'UGE-1 with increased natural gas capacity': a **state of asset** and a **non-actual individual**;

— 'UGE-1 natural gas capacity upgrade': an **activity**, **whole life individual** and **non-actual individual**;

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity, **whole life individual** and **actual individual**.

These objects, with their classifications and relationships, are shown in Figure 10.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

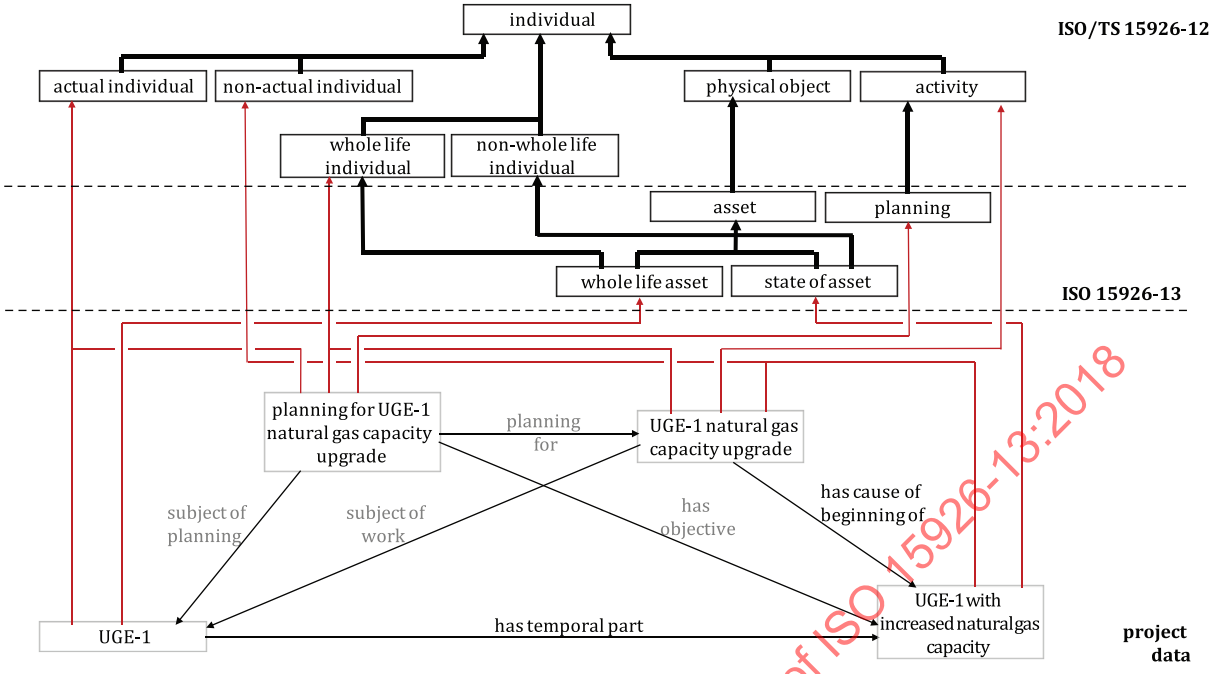

Figure 10 — Objective of planning

5.2.2 Required or proposed activity and specification

A required or proposed **activity** is defined by its relationships and classifications.

EXAMPLE 1 UG Oil wishes to upgrade the natural gas processing system on platform UGE-1 from a capacity of 100 million ft^3 per day to a capacity of 180 million ft^3 per day by the end of November 2016.

This statement of requirements can be split into:

— the required **activity**: "UGE-1 natural gas capacity upgrade" is completed before the end of November 2016;

— the required **activity** creates a required **state of asset** that is:

  — a **temporal part of** platform UGE-1';

  — has a natural gas processing capacity of 180 million ft^3 per day.

This statement of requirements is shown diagrammatically in Figure 11.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

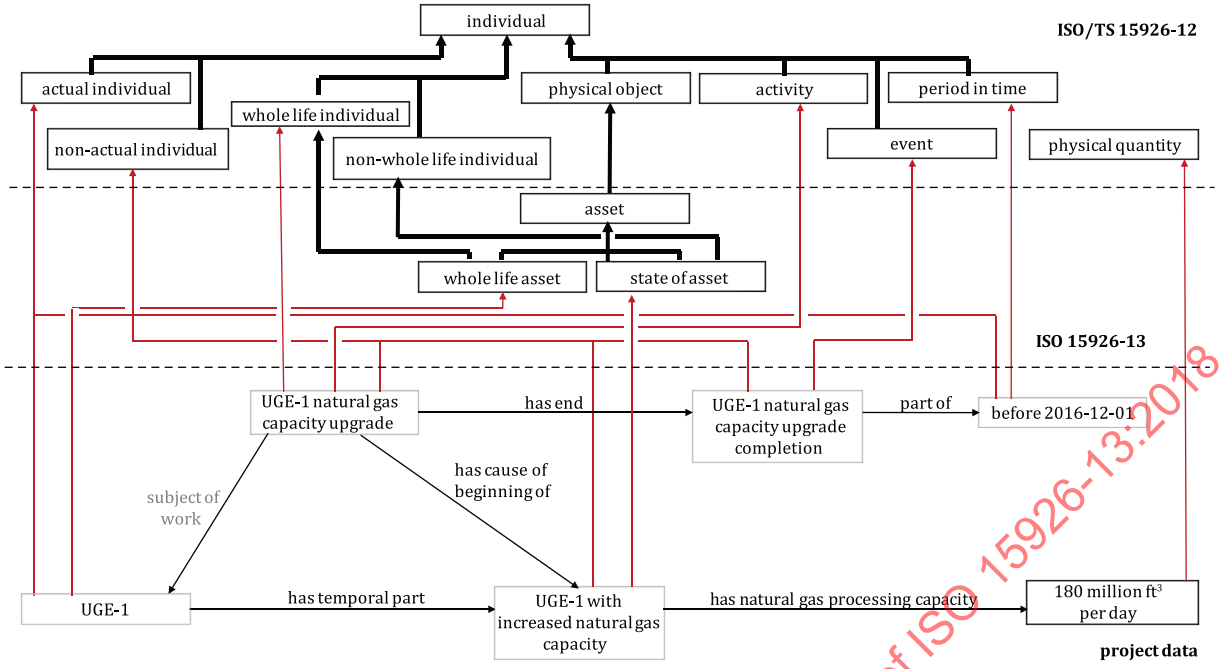

Figure 11 — Requirements for an activity

A **specification** expresses the relationships and classifications that define a required or proposed **activity** as a single classification.

NOTE The expression of the definition of a required or proposed **activity** as a single classification simplifies the representation of multiple versions of a definition.

As planning progresses, proposed **activities** that implement a requirement are defined. A **specification** for a proposed **activity** may contain:

— a breakdown of the overall **activity** into parts;

— a classification of the part **activities** with respect to an **activity breakdown structure**;

— **resources** required by the part activities, and their classification with respect to a **resource breakdown structure**;

— succession dependencies between part **activities**;

— proposed start and end times for the part **activities**.

EXAMPLE 2 UG oil wishes to upgrade the natural gas processing system on platform UGE-1. The initial proposal increases the capacity from 100 million ft^3 per day to a 180 million ft^3 per day by the end of November 2016. Subsequently there is a new proposal to increase the capacity to 200 million ft^3 per day by the end of December 2016.

There are two specifications as follows:

— **specification** version 1 that is the subclass of:

  — activity completed before the end of November 2016;

  — activity that creates a state of UGE-1 with a natural gas capacity of 180 million ft^3 per day;

— **specification** version 2 that is the subclass of:

  — activity completed before the end of December 2016;

  — activity that creates a state of UGE-1 with a natural gas capacity of 200 million ft^3 per day.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

There is a **succeeded by** relationship between the two specifications. The objects and their relationships are shown in Figure 12.

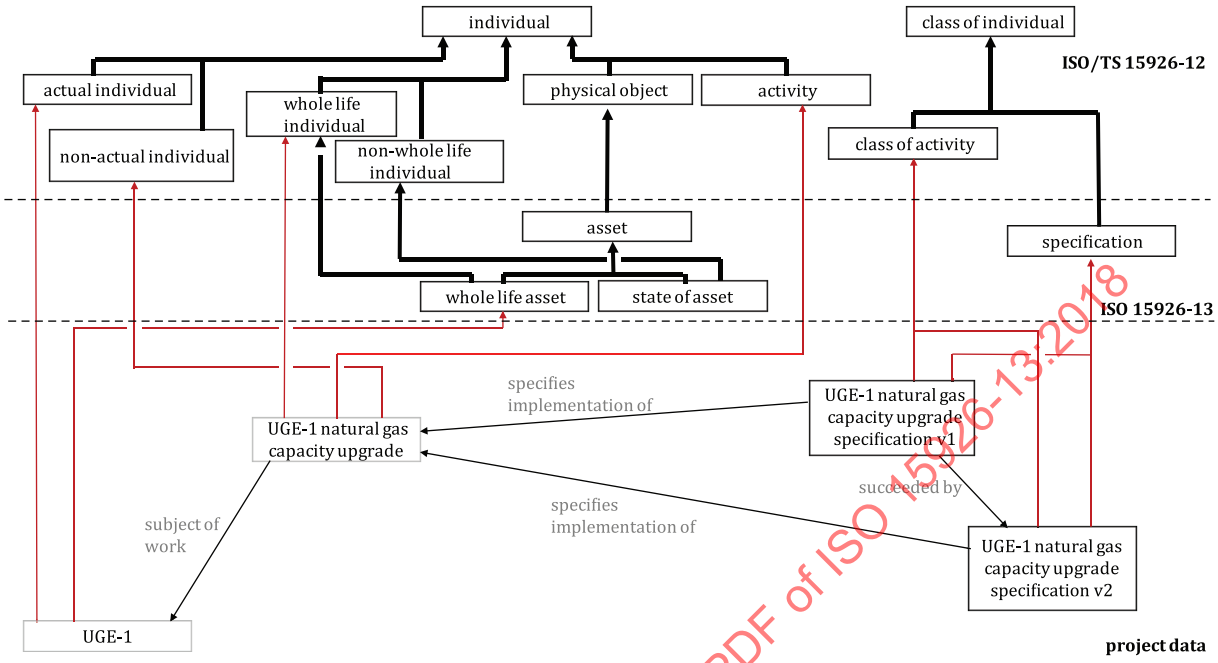

Figure 12 — Specifications and versions

5.2.3 Alternative specifications

Alternative proposed **activities** can be defined for a required **activity**. Each proposed **activity** has a **specification**. There is a **specification has alternative** relationship between two alternative **specifications**.

EXAMPLE Two alternative **specifications** are produced for the UGE-1 natural gas capacity upgrade to 200 million ft^3 per day by the end of December 2016 – specification version 2a and specification version 2b. Subsequently version 2b is issued as a part of **schedule** version 2.3.

There is a **specification has alternative** relationship between the two specifications. The objects and their relationships are shown in Figure 13.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

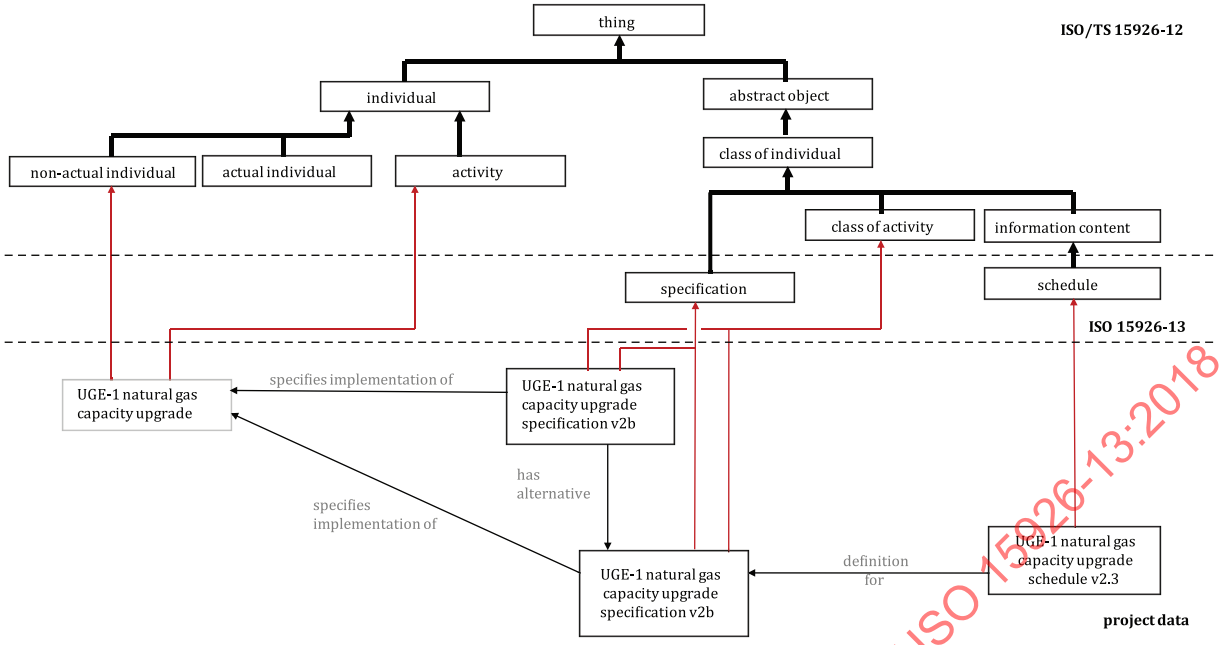

Figure 13 — Alternative specifications

5.3 Schedule

5.3.1 Definition of a schedule

A **schedule** is **information content** that defines the work to be done. A **schedule** defines the **specification** of a proposed **activity**.

NOTE 1 A **schedule** can be part of a contract and can contain other information that is relevant to the performance of the contract.

NOTE 2 A **schedule** can contain person readable documents, structured content such as spreadsheets, and formal content defined by standards such as this document.

A **schedule** and a **specification** that is defined by it are created by a **planning** activity.

NOTE 3 Within an overall **planning** activity, a **schedule** and a **specification** can be created by different people at different times.

EXAMPLE The **planning** activity "planning for the UGE-1 natural gas capacity upgrade" creates the **specification** version 2 of the work to be done in June 2016. This **specification** is included within **schedule** version 2.3, which is created in July 2016. The objects and their relationships are shown in Figure 14.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

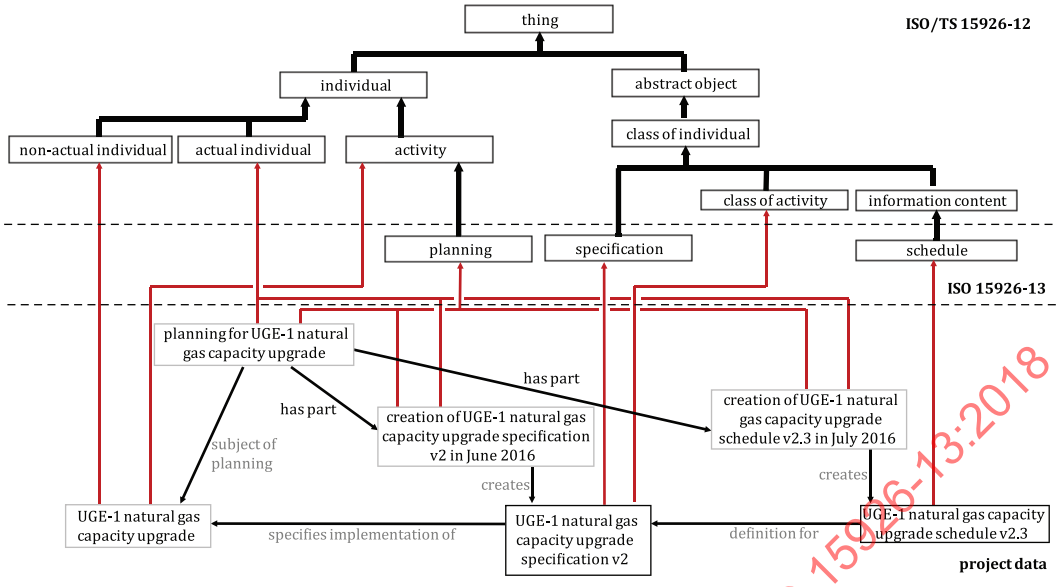

Figure 14 — Creation of a specification and schedule

5.3.2 Level of a schedule

A schedule exists at different levels in the planning process, and is classified according to its level.

NOTE Schedule levels are not standardized in this document, but can be defined in a Reference Data Library. Common schedule levels and their use are described in Annex D.

EXAMPLE 1 In the example in 5.3.1, the schedule version 2.3 is created in July 2016. This schedule is a level 3 "project coordination schedule". This is shown in Figure 15.

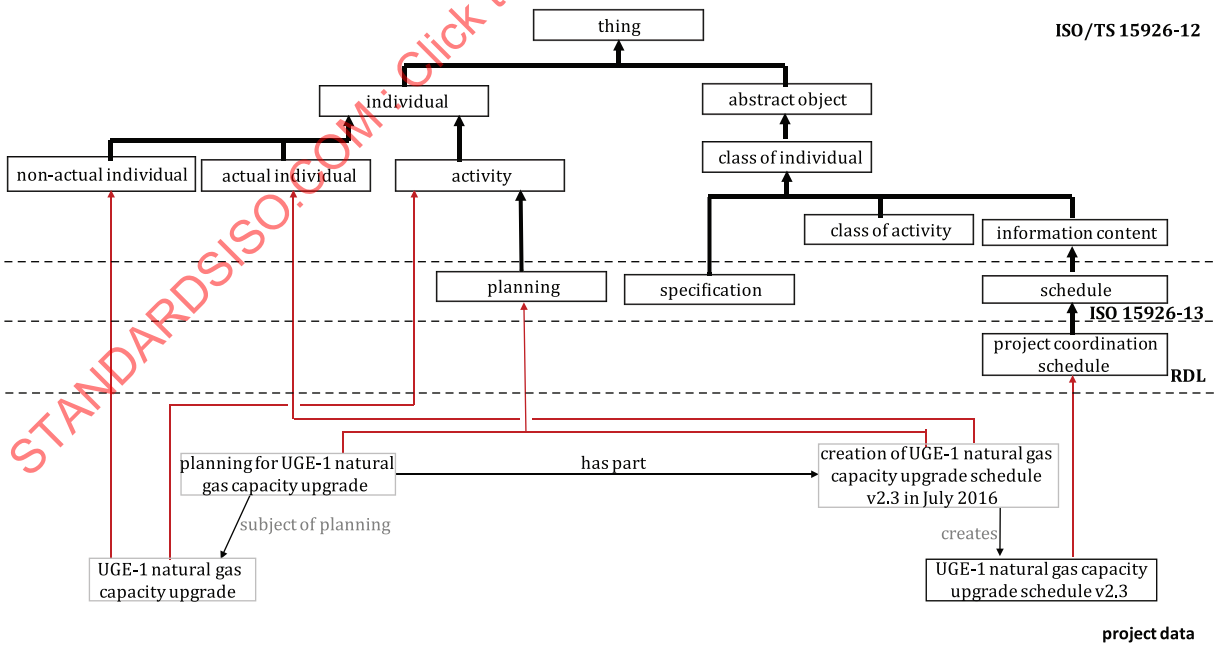

Figure 15 — Classification of a schedule by level

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

Subclasses of schedule according to level, which are defined in a Reference Data Library are classified as members of **schedule level**.

EXAMPLE 2 The subclasses of schedule "project master schedule", "project summary schedule" and "project coordination schedule" are all members of schedule level. This is shown in Figure 16.

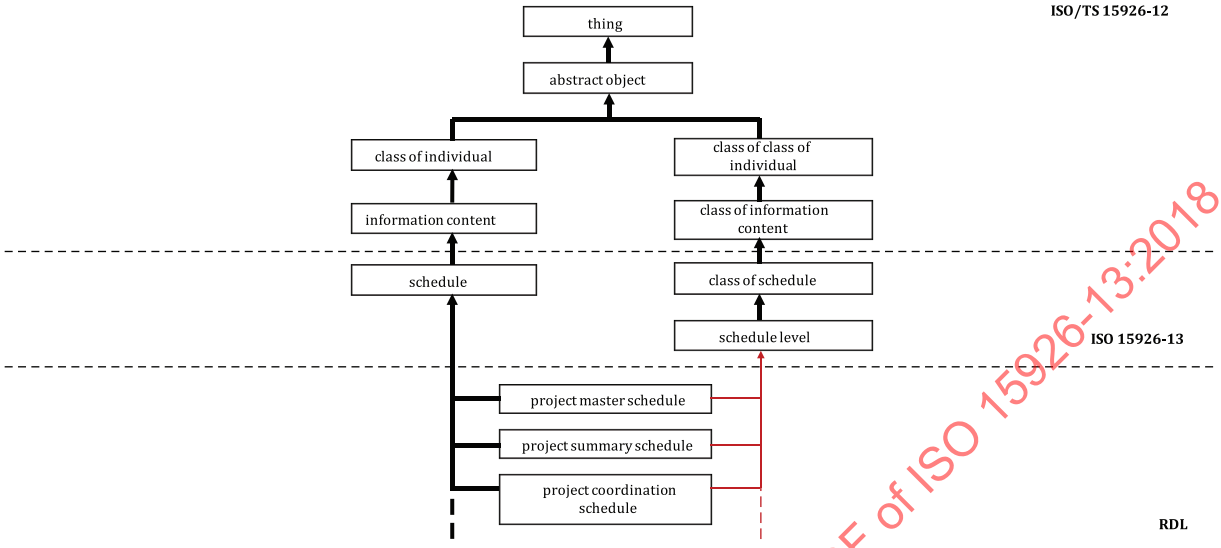

Figure 16 — Schedule level

A **schedule** that is specified to a level of detail appropriate for inclusion within a work order is a **schedule for work order**.

5.3.3 Role of a schedule

Different **schedules** have different roles with respect to a **planning** activity. A role is indicted by the relationship between the **planning** activity and the **schedule**. The following roles are defined by this document:

— **has baseline schedule**;

— **has current schedule**.

NOTE 1 Other roles can be defined within a Reference Data Library. Common roles include:

— has revised schedule;

— has live schedule.

A **schedule** does not always play the same role. The **schedule** does not change, but instead it is the **planning** activity that changes. Therefore the role is stated by the relationship with the **planning** activity.

NOTE 2 A relationship, such as **current schedule**, is usually with a temporal part of the overall **planning** activity.

EXAMPLE The 'UGE-1 natural gas capacity upgrade schedule version 2.3'' is set as the baseline by the planning activity on 1st July 2016 and is initially both current and the baseline. It is replaced as the current schedule by version 2.4 on 13th September 2016. Objects are as follows:

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity and an **actual individual**;

— 'planning for UGE-1 natural gas capacity upgrade from 1st July 2016': a **planning** activity and an **actual individual**;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

— 'planning for UGE-1 natural gas capacity upgrade from 1st July to 13th September': a **planning** activity and an **actual individual**;

— 'planning for UGE-1 natural gas capacity upgrade from 13th September': a **planning** activity and an **actual individual**;

— 'UGE-1 natural gas capacity upgrade schedule version 2.3': a **schedule**;

— 'UGE-1 natural gas capacity upgrade schedule version 2.4': a **schedule**.

These objects, with their classifications and relationships, are shown in Figure 17.

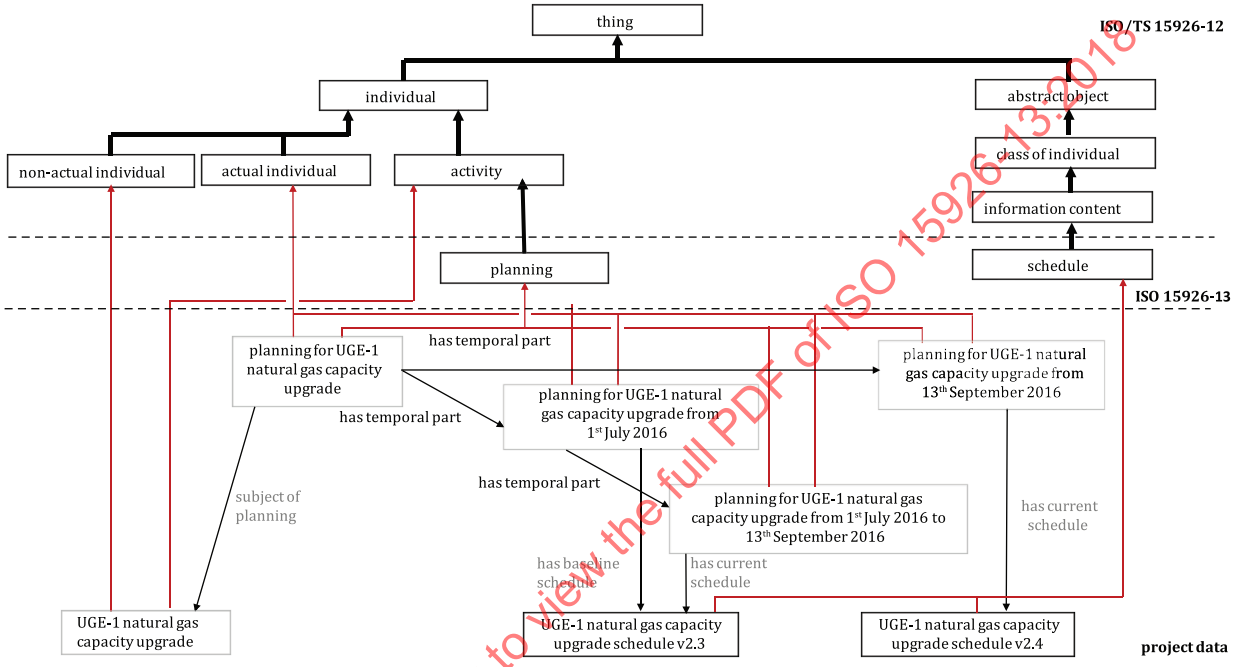

Figure 17 — Baseline and current schedules

The periods in time during which a **schedule** is a baseline or current are recorded by the start and end times of the **planning** activities with which they have a **has baseline schedule** or **has current schedule** relationship.

5.4 Planning activity

The way in which the **specifications** and **schedules** for a required **activity** change with time is recorded by their relationships with the **planning** activity.

EXAMPLE 1 This is shown in Figure 17.

The following may be recorded for any **activity**:

— the **period of time** during which it takes place;

— the **person** or **organization** that performs it;

— the **information objects** that are referenced by it.

EXAMPLE 2 On 4th November 2016, a "project summary schedule" is created from a "project coordination schedule". Objects are as follows:

— 'UGE-1 natural gas capacity upgrade': an **activity** and **non-actual individual**;

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity and an **actual individual**;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

— 'creation of UGE-1 natural gas capacity upgrade project summary schedule on 4th November 2016': a **planning** activity and an **actual individual**;

— 'UGE-1 natural gas capacity upgrade project coordination schedule v2.3 – 2016-11-04': a **schedule**;

— 'UGE-1 natural gas capacity upgrade project summary schedule v2.3 – 2016-11-04': a **schedule**.

These objects, with their classifications and relationships, are shown in Figure 18.

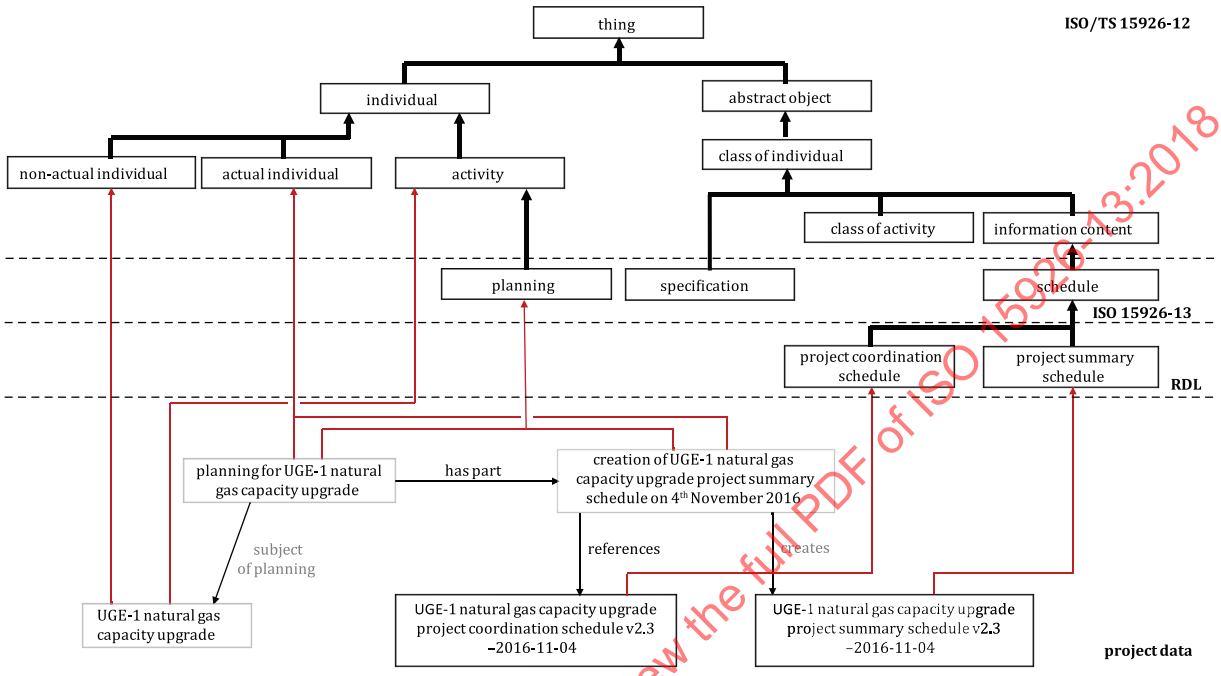

Figure 18 — Creation of a Project Summary Schedule

5.5 Actual activity that fulfils a requirement

A **planning** activity creates a **specification** for a proposed implementation of the requirement.

An actual **activity** has a **follows specification** relationship with the **specification**.

NOTE 1 A **follows specification** relationship does not state that the **activity** is a member of the class defined by the **specification**. It merely states that this is what is intended.

An **actual activity** has a **fulfils** relationship with the required **activity**.

NOTE 2 A **fulfils** relationship does not state that the actual **activity** fulfils the requirement. It merely states that this is what was obtained.

As work progresses:

— properties of the actual **activity**, such as percentage complete, resources used, and expenditure, are recorded;

— the **planning** activity revises the specification followed by the actual activity.

The properties of the actual **activity** change with time and are recorded for temporal parts of the actual **activity**.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

A **planning** activity has a **monitors** relationship with an actual **activity** that follows the **specification**.

EXAMPLE The 'actual UGE-1 natural gas capacity upgrade' **fulfils** the required 'UGE-1 natural gas capacity upgrade'. The temporal part 'actual UGE-1 natural gas capacity upgrade to 13th September 2016' **follows specification** 'UGE-1 natural gas capacity upgrade specification version 2' contained in 'UGE-1 natural gas capacity upgrade schedule version 2.3'. On the 13th September 2016, the 'actual UGE-1 natural gas capacity upgrade' is 50 % complete.

The objects that record the required **activity**, the actual **activity** and its percentage complete, the **planning** activity; the **specification** and the **schedule** are as follows:

— 'UGE-1 natural gas capacity upgrade': an **activity** and **non-actual individual**;

— 'actual UGE-1 natural gas capacity upgrade': an **activity** and **actual individual**;

— 'actual UGE-1 natural gas capacity upgrade to 13th September 2016': an **actual activity**;

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity and an **actual activity**;

— 'UGE-1 natural gas capacity upgrade specification version 2': a **specification**;

— 'UGE-1 natural gas capacity upgrade schedule version 2.3': a **schedule**.

These objects, with their classifications and relationships, are shown in Figure 19.

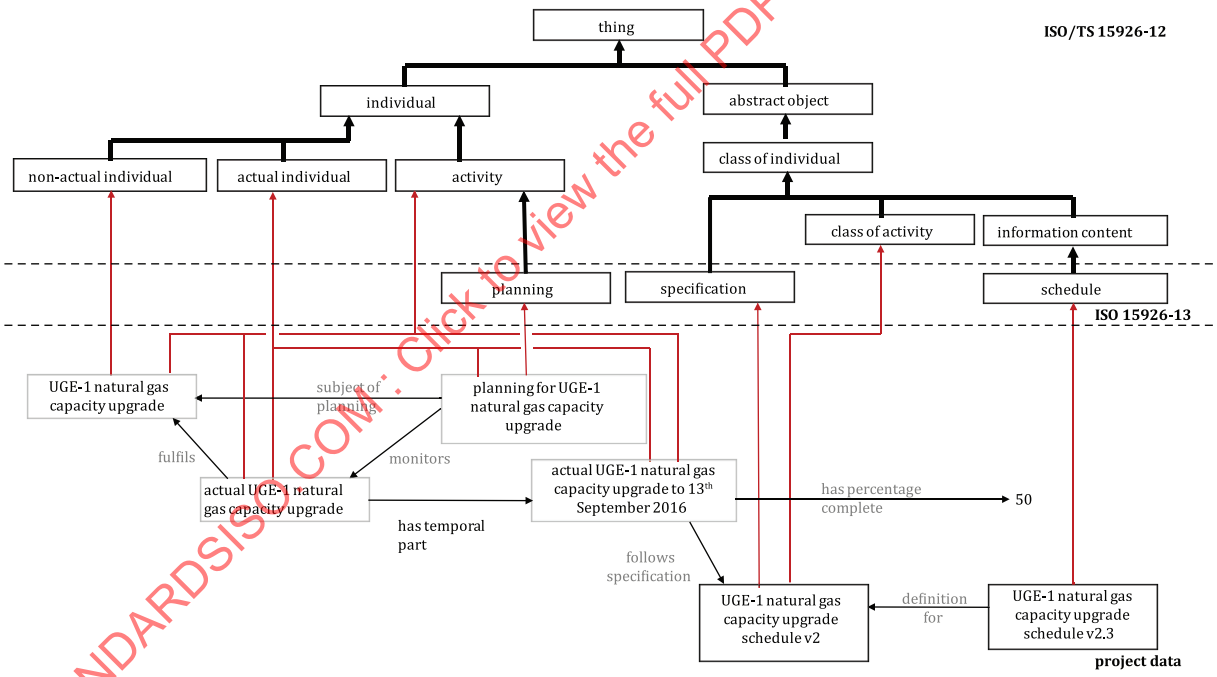

Figure 19 — Actual activity to fulfil a requirement

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

5.6 Decomposition of an activity

5.6.1 Parts of activities and their level

An **activity** has smaller part **activities**. An **activity** is classified according to its size and level.

NOTE 1 Classifications of **activity** according to size and level, such as "project", "project phase", "work package" and "task", are not standardized in this document, but can be defined in a Reference Data Library. Common **activity** levels and their use are described in Annex 0.

© ISO 2018 – All rights reserved

NOTE 2 Planning software requires an explicit statement of the "top" **activity** and the parts that need to be scheduled. In the "Scheduling Application View" defined in 5.17, the two level structure is made explicit by classifying the "top" **activity** as **project** and the parts that need to be scheduled as **activity in project**.

Whole-part relationships between activities that are not relevant to the scheduling, such as the relationship between an activity in project and a project phase or work package, are recorded in the "Scheduling Application View" by an **activity part of** relationship.

EXAMPLE The required project 'refurbishment of facility F_101' has the work package 'pouring concrete for refurbishment of facility F_101' as a part.

Objects are as follows:

— 'refurbishment of facility F_101': a "project" and **activity**;

— 'pouring concrete for refurbishment of facility F_101': a "work package" and **activity**.

These objects, with their classifications and relationships, are shown in Figure 20.

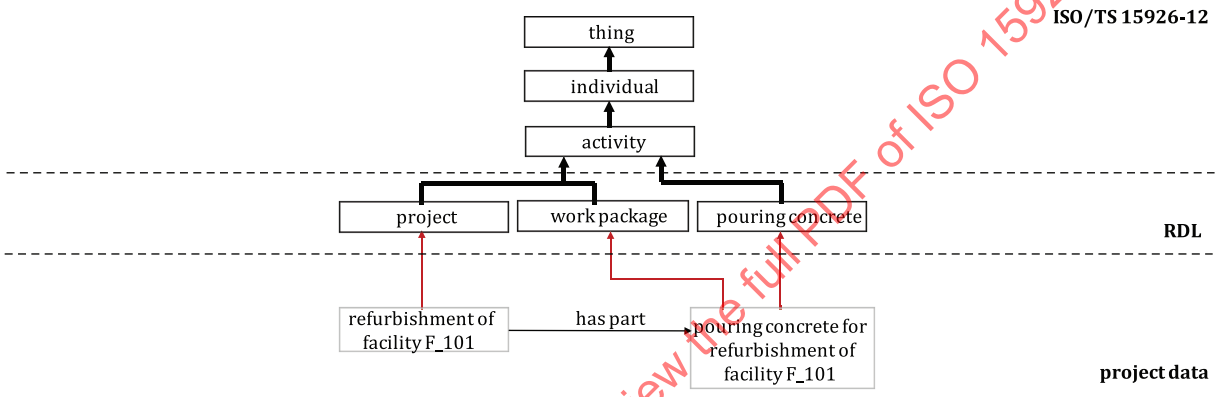

Figure 20 — Project and work package

5.6.2 Decomposition of a specification

A **specification** specifies the parts of an **activity**.

EXAMPLE 1 The relationships **class has part occurrence** between **specifications** P and A states that a member of P has a member of A as a part, and that a member of A is a part of a member of P.

NOTE Whether a decomposition of a required **activity** is recorded by **has part** relationships between **activities**, by **class has part occurrence** relationships between **specifications**, or both is a choice. For the "Scheduling Application View", the choice is defined in Clause 6.

EXAMPLE 2 The **specification** 'refurbishment of facility F_101 specification version 2' specifies that a member of 'pouring concrete for the refurbishment of facility F_101 specification version 2' is a part.

Objects are as follows:

— 'refurbishment of facility F_101': an **activity**;

— 'refurbishment of facility F_101 specification version 2': a **specification** and **class of activity**;

— 'pouring concrete for refurbishment of facility F_101': an **activity**;

— 'pouring concrete for refurbishment of facility F_101 specification version 2': a **specification** and **class of activity**.

These objects, with their classifications and relationships, are shown in Figure 21.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

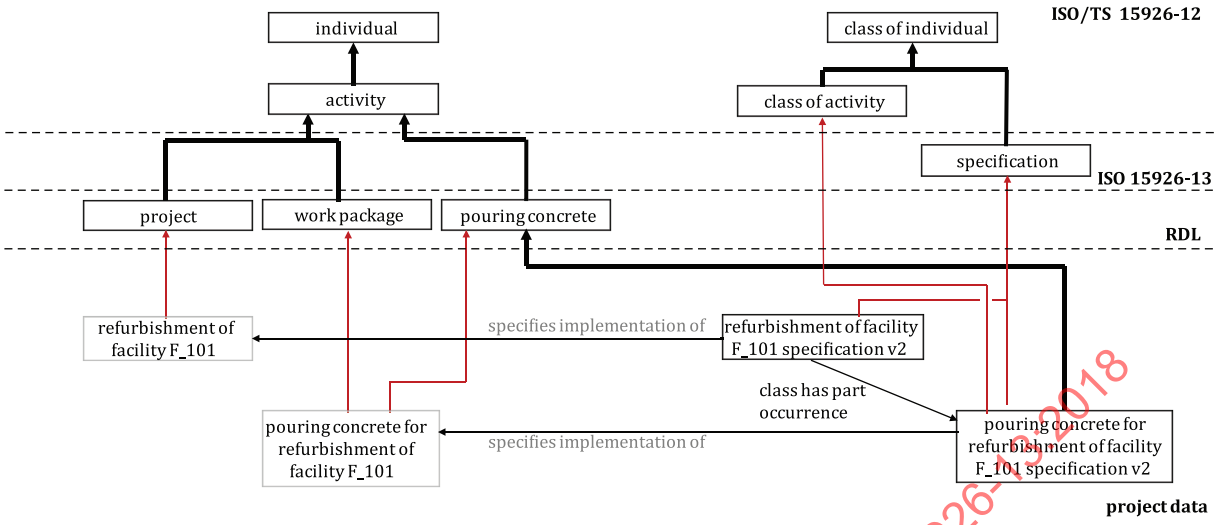

Figure 21 — Specification and decomposition

5.7 Classifications of an activity

5.7.1 Activity purpose and activity breakdown

An **activity** may be classified according to its purpose.

NOTE 1 Classes of **activity** according to purpose are not standardized in this document but can be defined in a Reference Data Library. Such classes are often domain specific. Classes of activity according to purpose which are of significance to oil and gas exploration and production include:

— drilling;

— well isolating;

— well servicing;

— well transfer;

— production activity revision.

An **activity** that is a part of a whole may be classified by an **activity breakdown class**.

NOTE 2 **Activity breakdown classes** are not standardized in this document but can be defined in a Reference Data Library.

EXAMPLE **Activity breakdown classes** are defined in ISO 19008.

5.7.2 Activity management objective

An **activity** can be classified according to business objective. Such subclasses of **activity** are members of **class of activity by business objective**.

NOTE **Classes of activity according to business objective** are not standardized in this document but can be defined in a Reference Data Library. Such classes are often domain specific. **Classes of activity according to business objective** which are of significance to oil and gas exploration and production include:

— increase oil and gas recovery;

— maintain business as usual;

— make incremental improvement;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

— make radical change;

— recover from disaster;

— manage closedown.

5.7.3 Asset life-cycle phase

An activity that is carried out on a major asset is part of an **asset life-cycle phase** for that asset. Subclasses of **asset life-cycle phase** specify the nature of the phase.

NOTE Subclasses of **asset life-cycle phase** are not standardized in this document but can be defined in a Reference Data Library. Such classes are often domain specific. Subclasses of **asset life-cycle phase** which are of significance to oil and gas exploration and production include:

— oil and gas field exploration: which begins when block or area is assigned to company, and ends with "oil and gas field planning";

— oil and gas field planning: which begins when an oil or gas field is declared commercial, and ends with "oil and gas field development";

— oil and gas field development: which begins when the licensee accepts the development concept, and ends with "oil and gas field operation";

— oil and gas field operation: which begins with regular start-up of production, and ends with "oil and gas field shutdown and decommissioning";

— oil and gas field shutdown and decommissioning: which begins when the operator submits a schedule for the shutdown of wells, and ends with "oil and gas field removal";

— oil and gas field removal: which begins when operator confirms the concept for removal of field installations.

EXAMPLE The facility UGE-1 is a **resource** for the **asset life-cycle phase** "operate UG - A field". The required **activity** "UGE-1 natural gas capacity upgrade" is part of the **asset life-cycle phase**. This is shown in Figure 22.

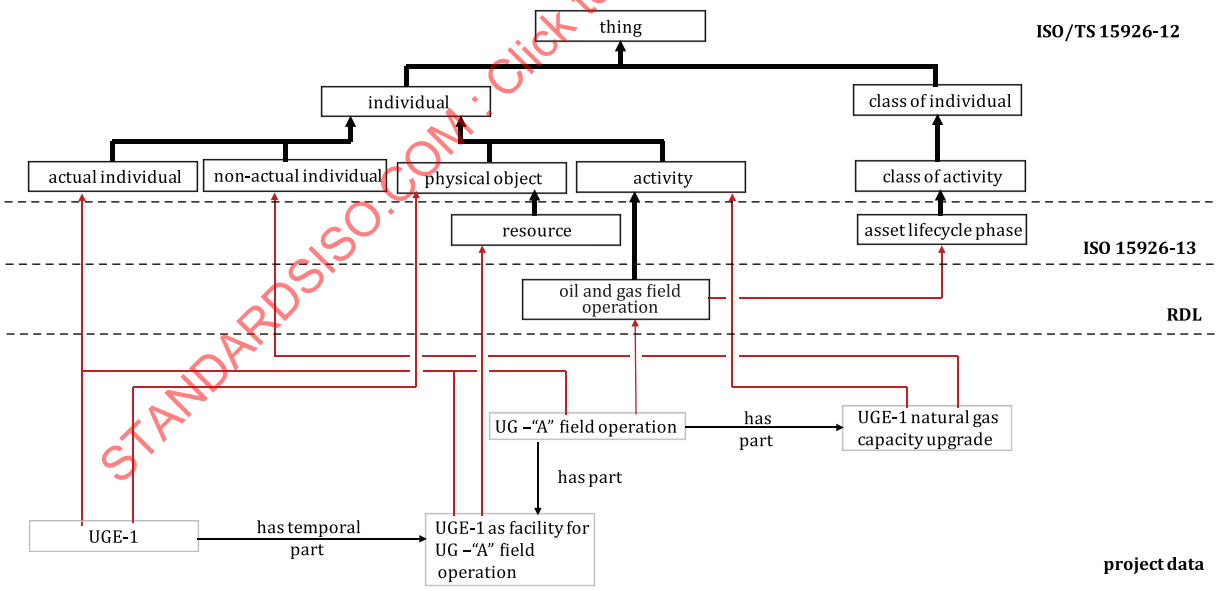

Figure 22 — Asset life-cycle phase

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.7.4 Activity risk

An **activity** may be classified according to the nature of a risk. Such a subclass of **activity** is a member of **activity risk factor**.

NOTE **Activity risk factors** are not standardized in this document, but can be defined in a Reference Data Library. Common risk factors include "height work", "hot work", "lifting operation" and "shallow gas operation".

EXAMPLE The **activity** 'replace the instrumentation of the flare tip of platform UGE-1' is a member of "height work". The specification 'replace the instrumentation of the flare tip of platform UGE-1 specification v3' is a subclass of "height work". These objects are shown in Figure 23.

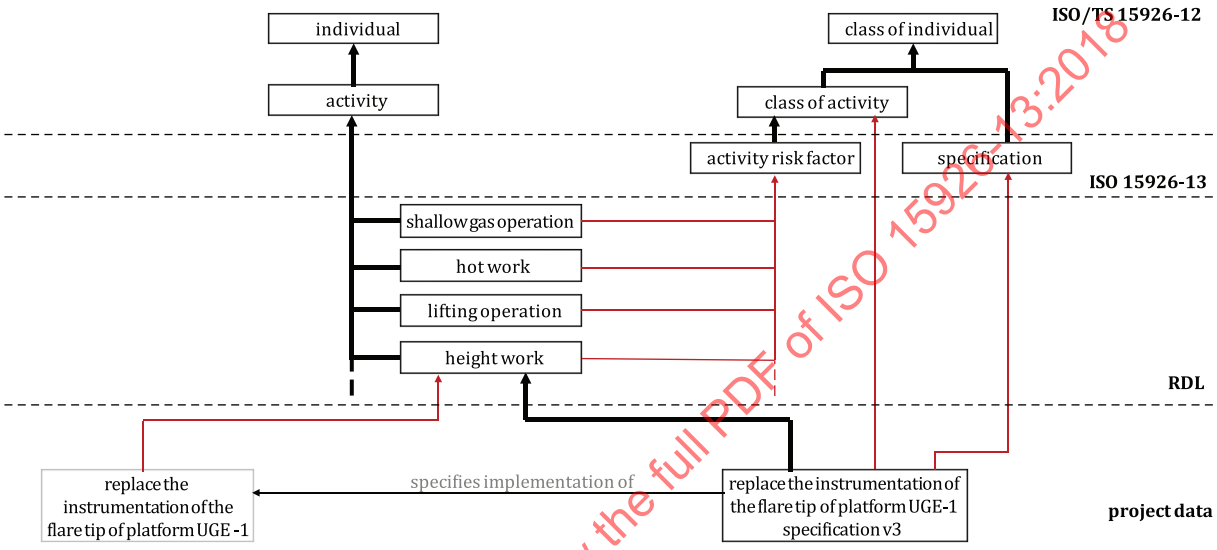

Figure 23 — Activity risk factor

In Figure 23, both the required **activity** and the **specification** for its implementation are associated with the **activity risk factor**. In some cases, a required **activity** does not necessarily have an **activity risk factor**. Instead some **specifications** of a possible implementations have the **activity risk factor**, but not others.

5.7.5 Activity criticality

An **activity** may be classified according to its criticality. Such a subclass of **activity** is a member of **activity criticality**.

NOTE **Activity criticalities** are not standardized in this document, but can be defined in a Reference Data Library. The criticality can be based upon business, safety or environmental concerns.

EXAMPLE The **activity** 'replace the instrumentation of the flare tip of platform UGE-1' is a member of "essential for continued operation". These objects are shown in Figure 24.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

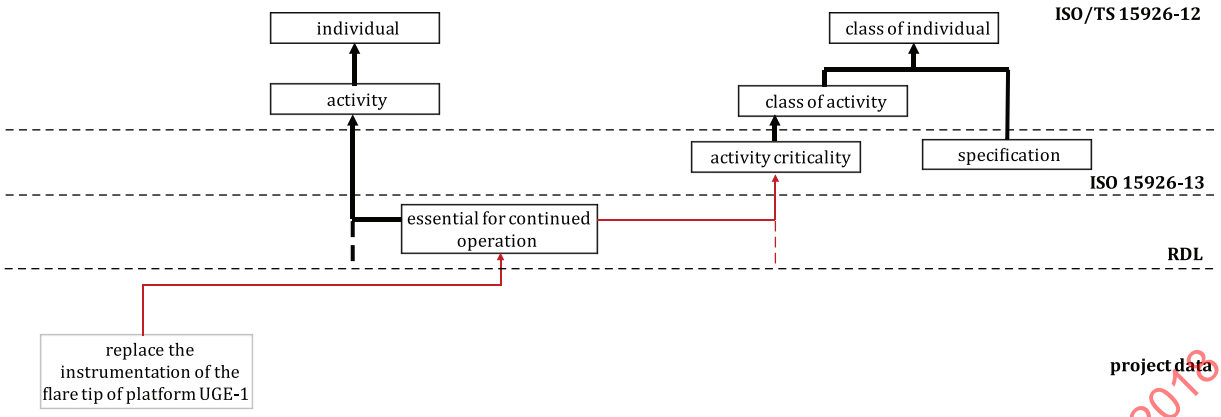

Figure 24 — Activity criticality

5.7.6 Activity priority

An **activity** may be classified according to its priority. Such a subclass of **activity** is a member of **activity priority**.

NOTE **Activity priorities** are not standardized in this document, but can be defined in a Reference Data Library.

EXAMPLE The **activity** 'replace the instrumentation of the flare tip of platform UGE-1' is a member of "high priority". These objects are shown in Figure 25.

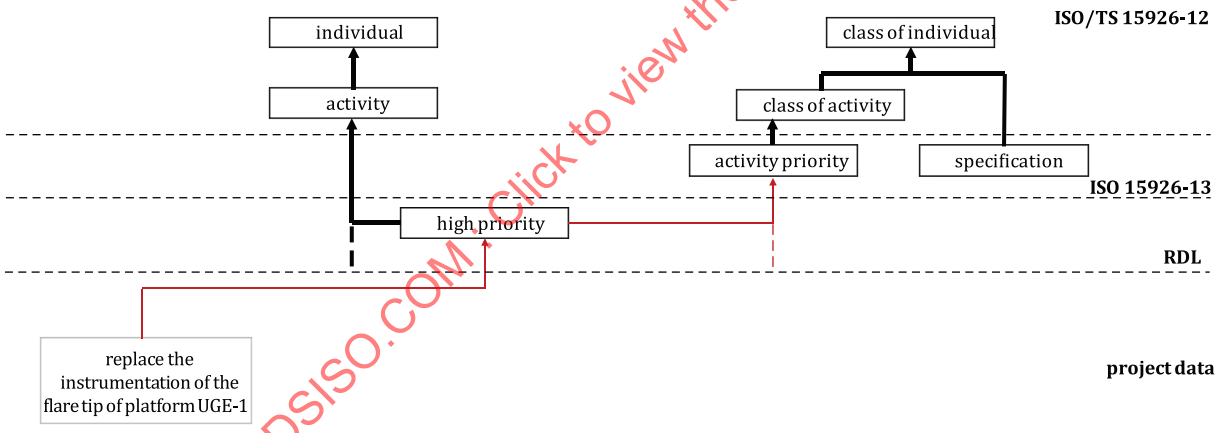

Figure 25 — Activity priority

5.7.7 Activity completion status

An **activity** may be classified according to its completion status. Such a subclass of **activity** is a member of **activity completion status**. The following **activity completion statuses** are standardized in this document:

— **active activity**;

— **completed activity**.

NOTE 1 Additional **activity completion statuses** can be defined in a Reference Data Library. Common statuses include "abandoned" and "paused".

NOTE 2 Usually an **activity completion status** is specified for an **actual activity**.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

ISO 15926 ontologies, do not have the concept of "now". Instead an **activity completion status** is specified for either:

— a **whole life individual**;

— a **non-whole life individual** and temporal part, where the end **point in time** is specified.

NOTE 3 The concept of "now" exists within the "scheduling application view" described in clause 6.3 An actual activity in the scheduling application view.

EXAMPLE The **activity** and **actual individual** 'actual replacement the instrumentation of the flare tip of platform UGE-1' has the status **active** in April 2015 and is 90 % complete. Objects are as follows:

— 'replacement the instrumentation of the flare tip of platform UGE-1': an **activity**, **whole life individual** and **non-actual individual**;

— 'actual replacement the instrumentation of the flare tip of platform UGE-1': an **activity**, **whole life individual** and **actual individual**;

— 'actual replacement the instrumentation of the flare tip of platform UGE-1 to May 2015': an **activity**, **non-whole life individual** and **actual individual**;

These objects, with their classifications and relationships, are shown in Figure 26.

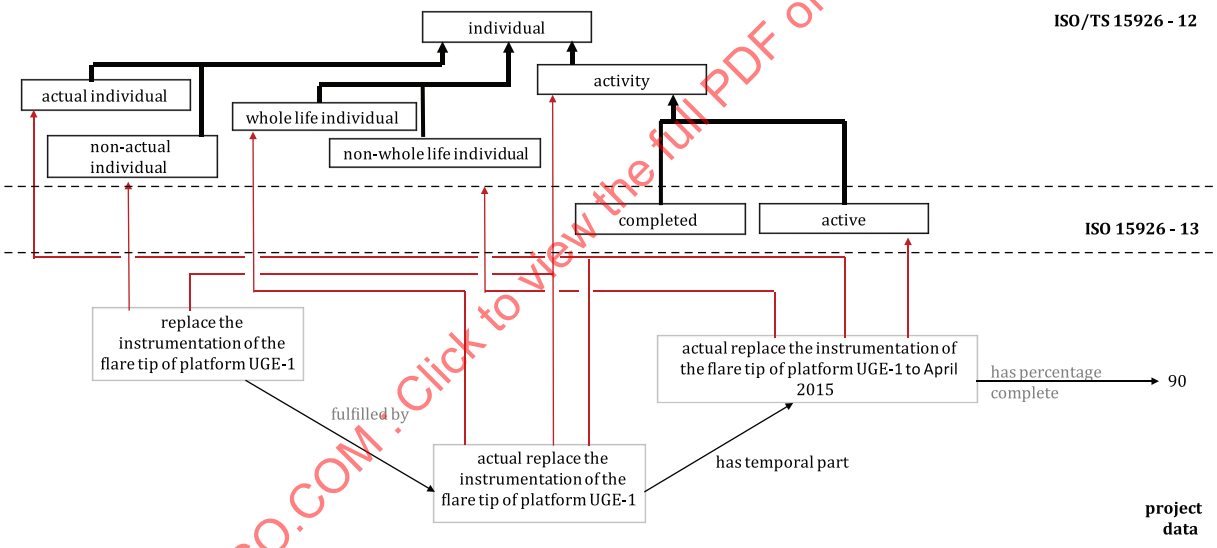

Figure 26 — An active activity

The **activity** and **actual individual** 'actual replacement the instrumentation of the flare tip of platform UGE-1' has the status **completed activity** in May 2015. The end point in time for the whole **activity** can be recorded. The final status can also be recorded as shown in Figure 27.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

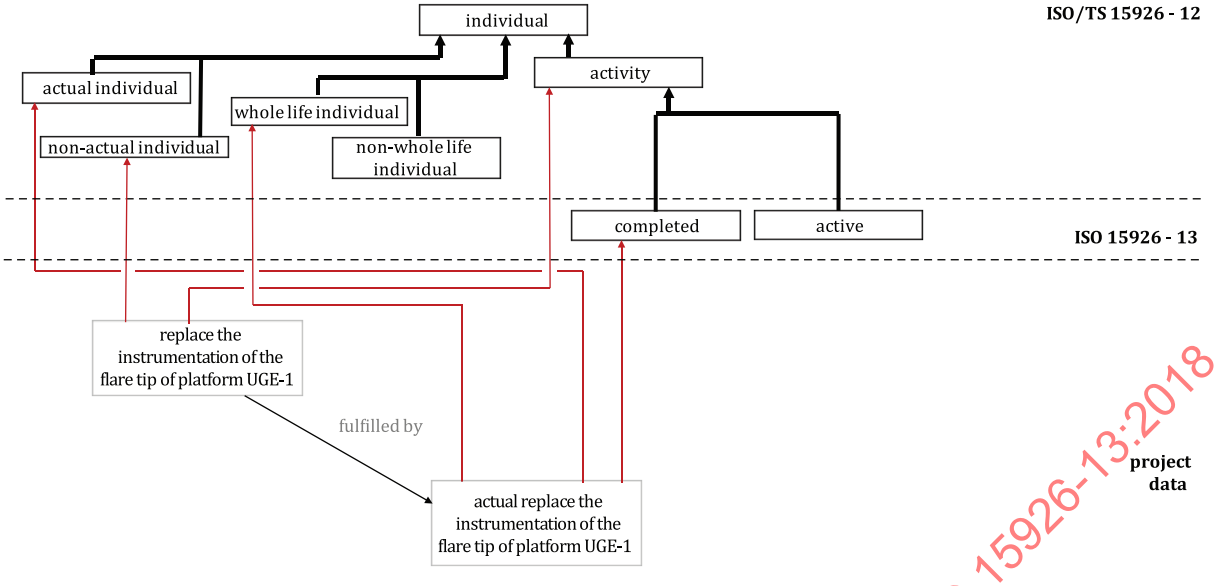

Figure 27 — A completed activity

5.7.8 Activity planning status

A **planning** activity gives the activity that it is **planning for** an **activity planning status**. The following are members of **activity planning status**:

— **planning – to be planned;**

— **planning – under planning**;

— **planning – cancelled**;

— **planning – ready for execution**.

These are subclasses of **planning** are according to the status that the **planning** activity gives to the **activity** that it is **planning for**.

NOTE 1 Additional **activity planning statuses** can be defined in a Reference Data Library.

NOTE 2 The status of a required **activity** can change with time. Therefore different temporal parts of a **planning** activity can be members of different **activity planning statuses**.

NOTE 3 Different planning activities can give the same required **activity** different statuses at the same time.

EXAMPLE The required **activity** "replace the instrumentation of the flare tip of platform UGE-1" is "under planning" in March 2015, and "ready for execution" in April 2015. This is shown in Figure 28.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

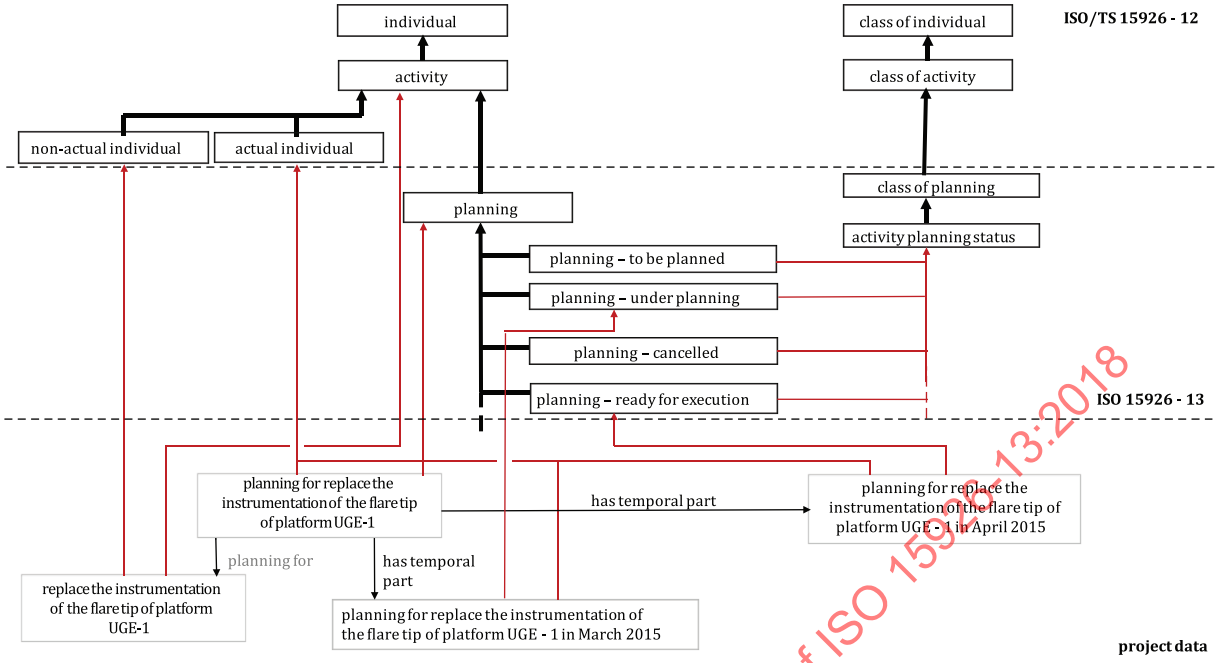

Figure 28 — Activity planning status

5.8 Resource for an activity

5.8.1 Specification of a resource

A **physical object** that is used to perform an **activity** is a **resource**.

NOTE 1 A **physical object** usually exists before and after an **activity**, so usually a **resource** is a temporal part of a whole life **physical object**. The source of a **resource** can be recorded by statements about earlier temporal parts of the **physical object**.

NOTE 2 A **resource** corresponds to the element "ProjectResource" in the UN/CEFACT XML schema (see Annex G).

A required or proposed **activity** has required or proposed **resources**. It is fulfilled by an actual **activity** that has actual **resources**.

A **resource** is classified and has a specified magnitude.

EXAMPLE 1 The required refurbishment of facility F_101 has required piping engineering **resource**. Version 2 of the proposal for the refurbishment of facility F_101 specifies 500 hours of piping engineering **resource**. This is shown in Figure 29.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

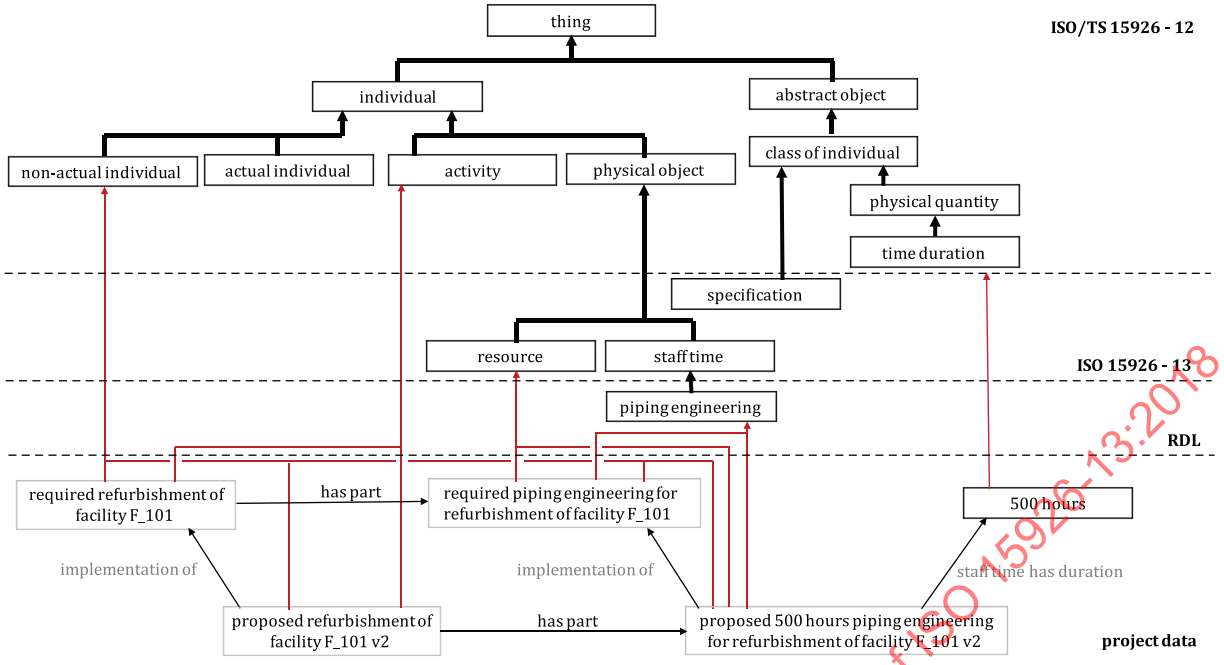

Figure 29 — Required and proposed piping engineering resource

The actual refurbishment of facility F_101, which fulfils the requirement, uses 510 hours of piping engineering **resource**. This is shown in Figure 30.

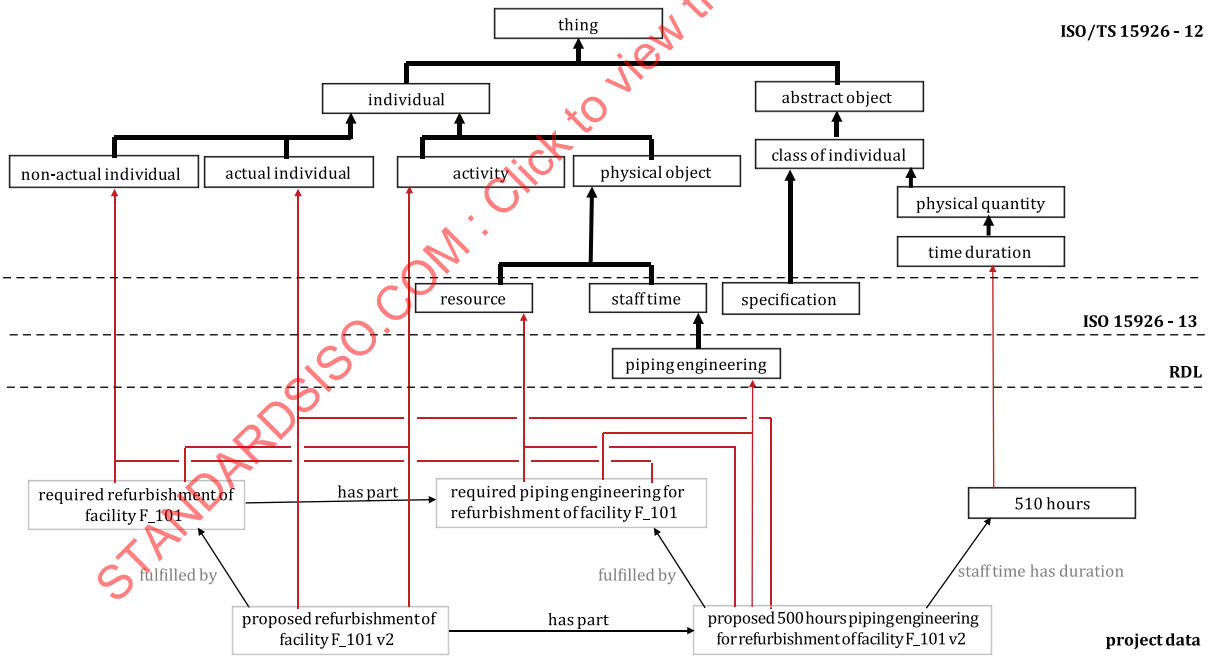

Figure 30 — Actual piping engineering resource

The classification and magnitude of a **resource** may be defined by a **specification**.

EXAMPLE 2 The proposed piping engineering **resource** of Example 1 is defined by a **specification** as shown in Figure 31.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

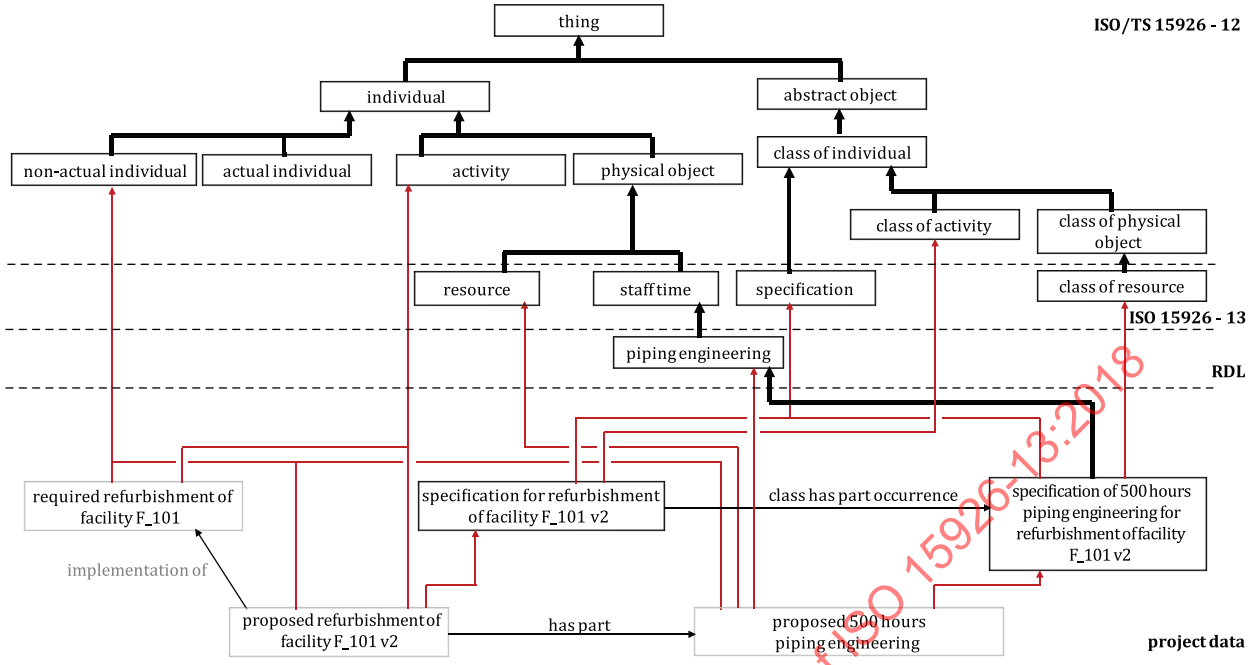

Figure 31 — Piping engineering resource specification

The **specification** "specification of 500 hours piping engineering for refurbishment of facility F_101 v2" shown in Figure 31, is made computer processable by the statement that each member of this class has a **duration of staff time** relationship with 500 hours.

The **specification** of the proposed piping engineering **resource** can be associated directly with the resource requirement. This is shown in Figure 32.

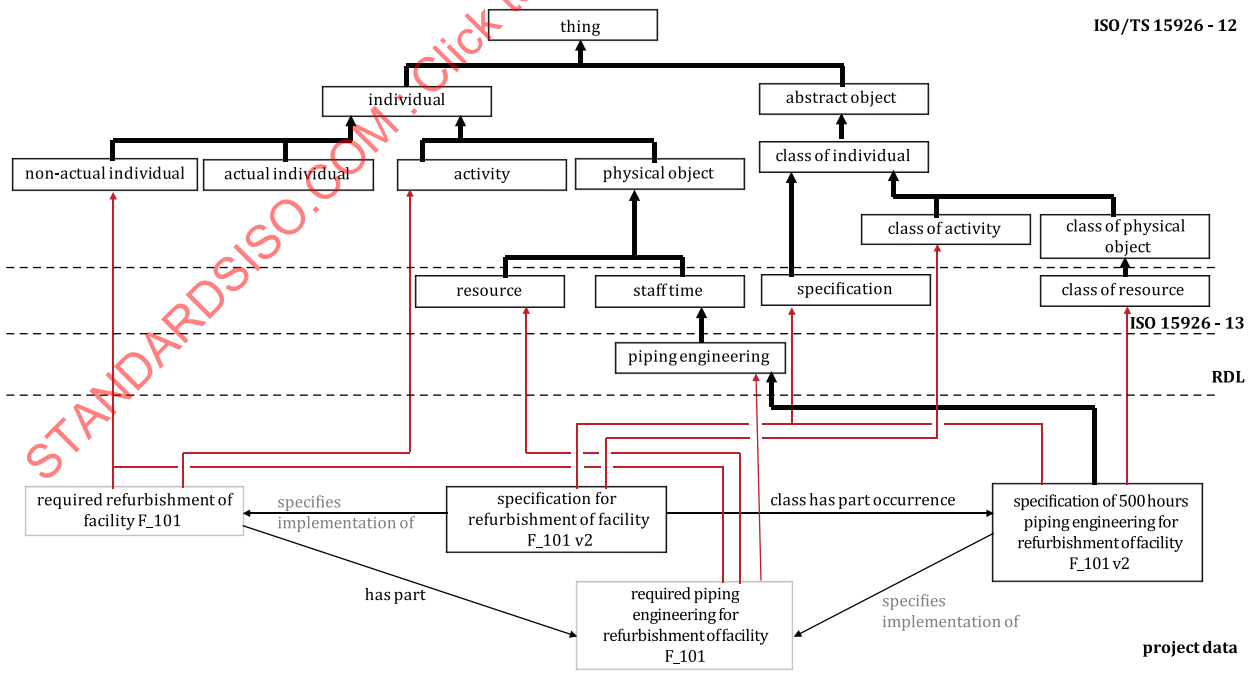

Figure 32 — Piping engineering resource requirement and specification

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

5.8.2 Resource breakdown

A **resource** for an **activity** that is a part of a whole may be classified by a **resource breakdown class**.

NOTE **Resource breakdown classes** are not standardized in this document but can be defined in a Reference Data Library. Resource breakdown classes are often associated with codes, and can be referred to as "Codes of resources".

EXAMPLE **Resource breakdown classes** are defined in ISO 19008.

5.8.3 Available physical object for a resource

A **resource** for a proposed **activity** is a role of **physical object** which may be available for only some **periods of time**.

NOTE A **physical object** can have a **calendar** of availability. A **physical object** can also be available only for defined **periods of time**.

EXAMPLE The required refurbishment of facility F_101 has required piping engineering **resource**. Version 2 of the proposal for the refurbishment of facility F_101 specifies 500 hours of piping engineering **resource** supplied by A. D. Vance and Partners.

The A. D. Vance and Partners piping engineering staff time has a 'professional engineering hours' **calendar**. The piping engineering staff time is available from January to June 2015 and in 2016, but not from July to December 2015 when it is already fully committed to another project. The objects with their classifications and relationships are shown in Figure 33.

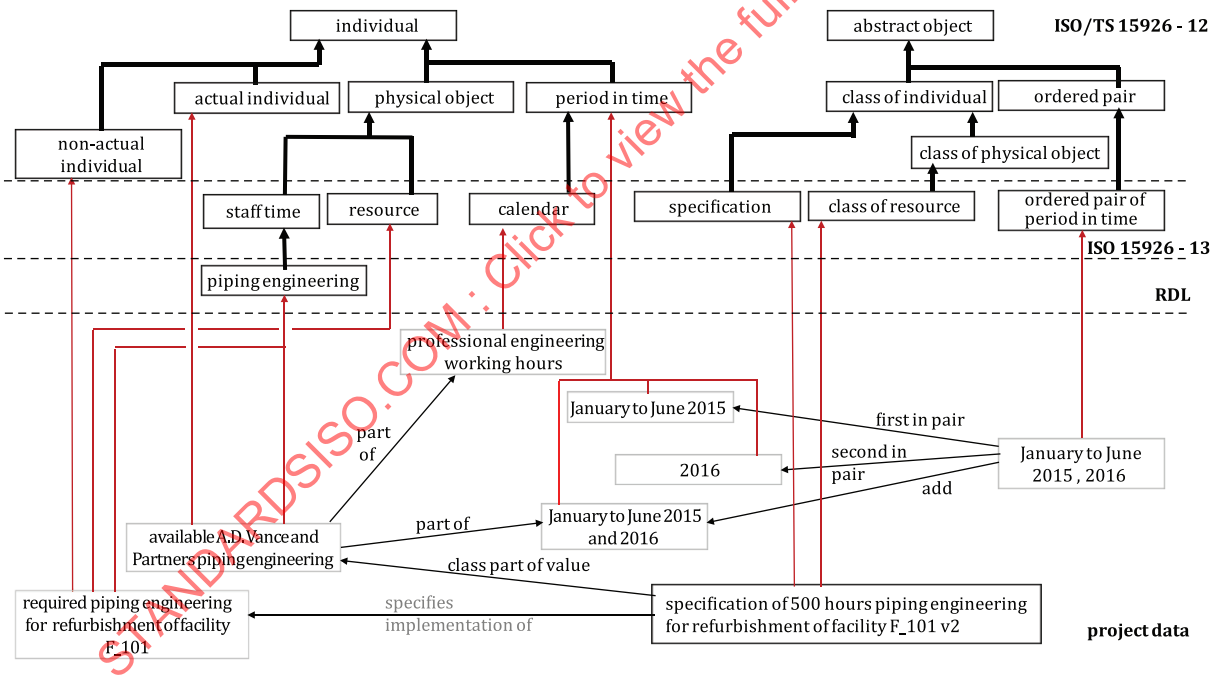

Figure 33 — Availability for a resource

5.8.4 Quantity-based and time-based resources

A **resource** may be classified according to how its amount is defined:

— **quantity based resource**: A quantity based **resource** is defined by what it is and how much.

EXAMPLE 1 The refurbishment of facility F_101 has required quantity-based **resources** as follows:

— 500 hours of piping engineering;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

— 100 tonnes of steel pipe.

— **time based resource**: A time based **resource** is defined by what it is and how long it is needed.

EXAMPLE 2 The refurbishment of facility F_101 has required time-based **resources** as follows:

— one stand-by rescue boat for the duration of the project;

— two 10 tonne SWL mobile cranes for 90 hours.

These subclasses of **resource** are members of **class of resource by quantity and time**.

5.8.5 Consumable material and equipment

A **resource** may be classified according to whether it is used up by the activity or whether it is equipment used to perform an activity as follows:

— **consumable material resource**: A **resource** that is consumed during the activity, and that does not have an existence after the activity

EXAMPLE 1 The refurbishment of facility F_101 has a required **consumable material resource** as follows:

— 100 tonnes of steel pipe.

— **equipment resource**: A **resource** is equipment needed to perform an activity.

EXAMPLE 2 The refurbishment of facility F_101 has a required **equipment resource** as follows:

— 400A generator for welding.

5.8.6 Quantity base resource usage

The amount of quantity-based **resource** used by an **activity** gives a measure of progress.

EXAMPLE The **specification** for the pouring of concrete in the refurbishment of facility F_101 version 2 has 200 tonnes of concrete mix as a **resource**. Objects are as follows:

— 'required pouring of concrete in the refurbishment of facility F_101': a **non-actual individual** and **activity**;

— 'pouring of concrete in the refurbishment of facility F_101 specification version 2': a **specification** and **class of activity**;

— 'required concrete mix for the refurbishment of facility F_101': a **non-actual individual** and **resource**;

— 'concrete mix for the refurbishment of facility F_101 specification version 2': a **specification** and **class of resource**;

These objects, with their classifications and relationships, are shown in Figure 34.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

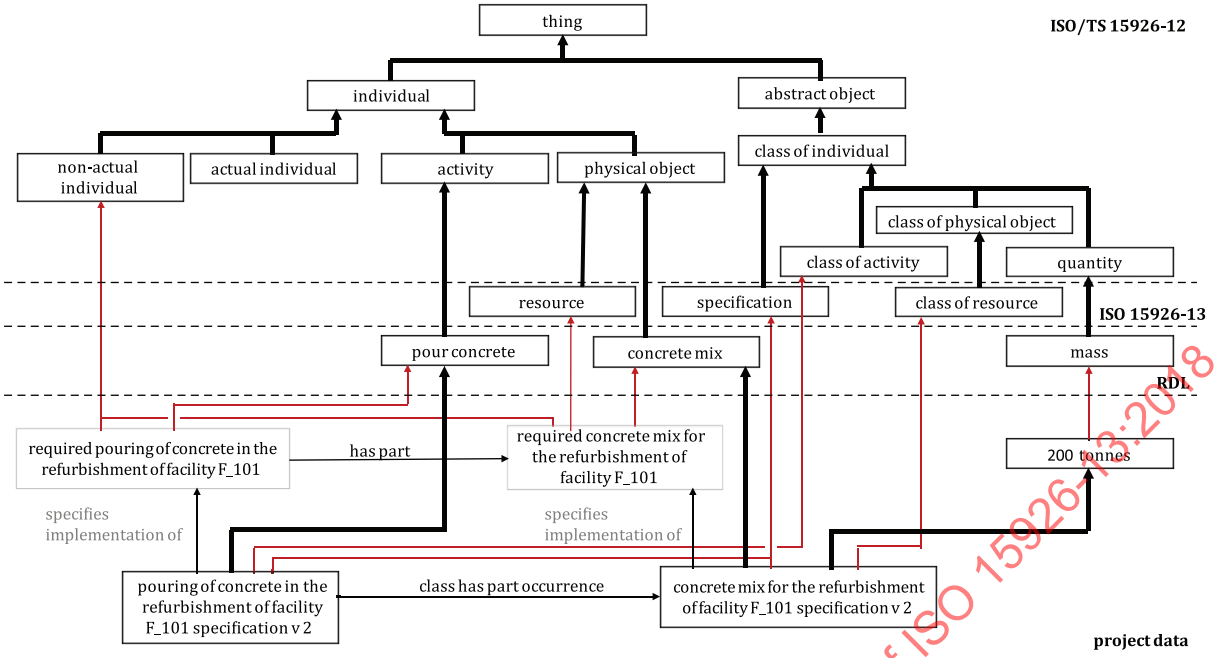

Figure 34 — Specified quantity for a resource

A quantity-based **resource** is used progressively as an **activity** progresses. In the period up to 2015-05-04, 50 tonnes of concrete mix are used by the actual pouring of concrete. This is a resource usage of 25 %. The additional objects are as follows:

— 'actual pouring of concrete in the refurbishment of facility F_101': an **actual individual** and **activity**;

— 'actual pouring of concrete in the refurbishment of facility F_101 to 2015-05-04': an **actual individual** and **activity**;

— 'actual concrete mix for the refurbishment of facility F_101': an **actual individual** and **resource**;

— 'actual concrete mix for the refurbishment of facility F_101 used to 2015-05-04': an **actual individual** and **resource**.

These objects, with their classifications and relationships, are shown in Figure 35.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

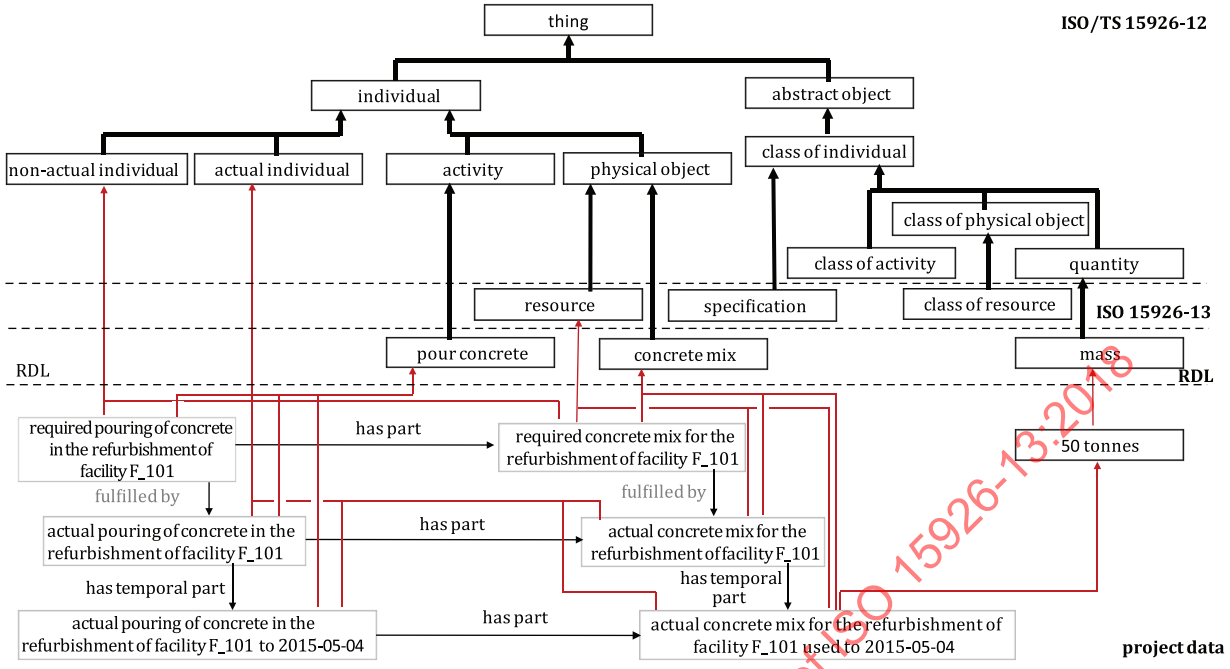

Figure 35 — Material quantity used

The ratio of the mass concrete mix used to 2015-05-04 to the mass of concrete mix in the specification gives a measure of progress. This is shown in Figure 36.

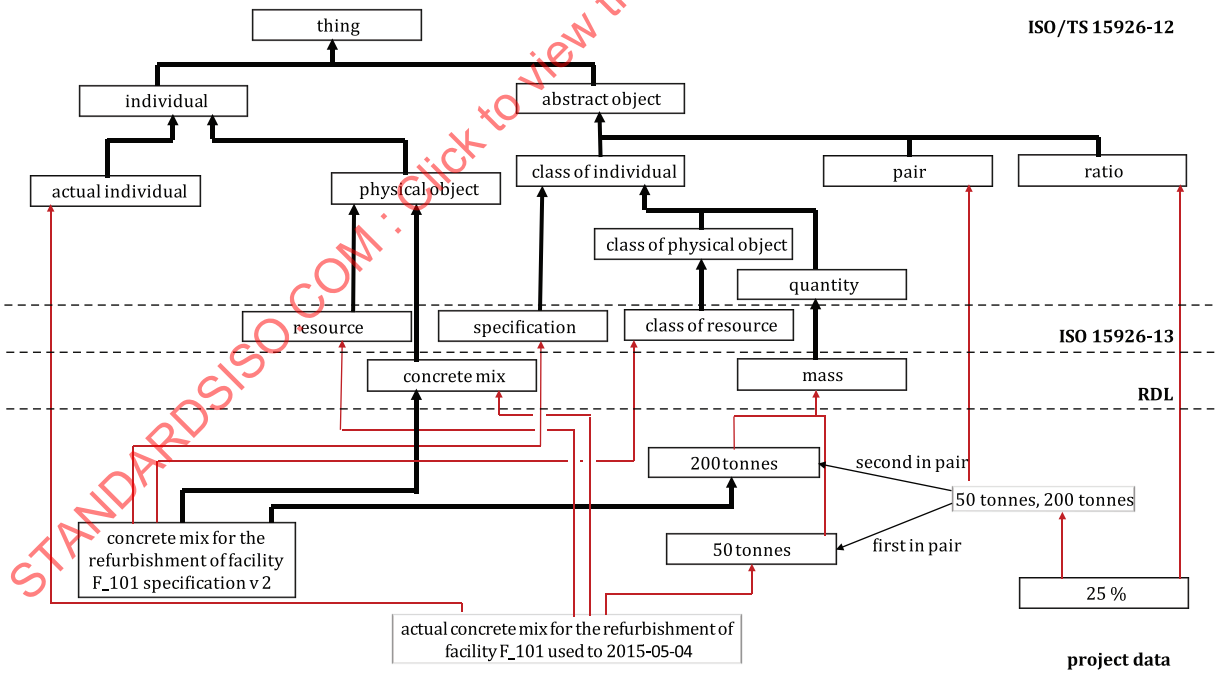

Figure 36 — Ratio of material quantity used to quantity in specification

5.8.7 Work centre and organizational level

A **work centre** is a **resource** for the performance of an **activity** that is provided by an **organization**.

NOTE 1 Subclasses of **work centre**, such as “main work centre” or “operational work centre” can be defined within a Reference Data Library.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

Subclasses of organization may be defined to specify the size and level of an **organization**.

NOTE 2 Subclasses of **organization** are not standardized in this document, but can be defined in a Reference Data Library. Common subclasses include “department” and “team”.

EXAMPLE The “Fred Bloggs and Co. on-site team and equipment” is the “operational work centre” for the pouring of concrete in the refurbishment of facility F_101 version 2. This is shown in Figure 37.

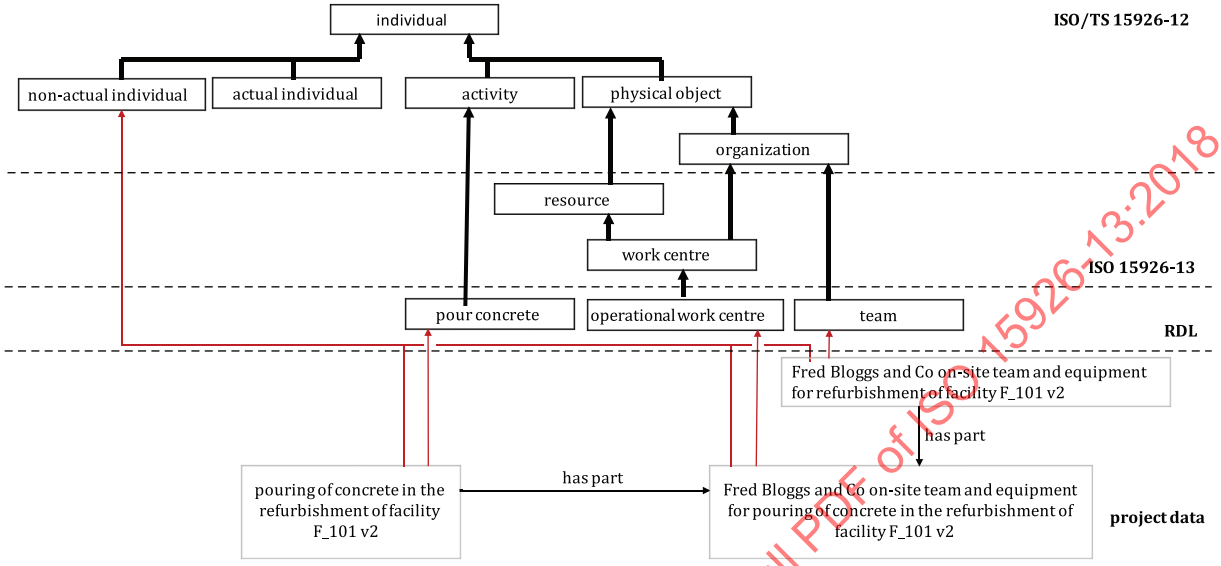

Figure 37 — Work centre

5.8.8 Staff time and discipline

The **staff time** is a **physical object** that is a **resource**.

A member of **staff time** has a **staff time has duration** relationship with a **time duration**.

NOTE 1 A **time duration** can be represented by a unit of measure, such as hours, or identified by a string defined by ISO 8601.

NOTE 2 A **duration** can be represented by a unit of measure, such as hours, or identified by a string defined by ISO 8601.

Staff time can be classified according to the engineering skill required. Such classifications are members of **discipline**.

NOTE 3 **Disciplines** are not standardized in this document, but can be defined in a Reference Data Library.

NOTE 4 Classifications of **staff time** are defined in ISO 19008.

EXAMPLE The “required piping engineering for refurbishment of facility F_101” is of the **discipline** “piping engineering”. This is shown in Figure 38.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

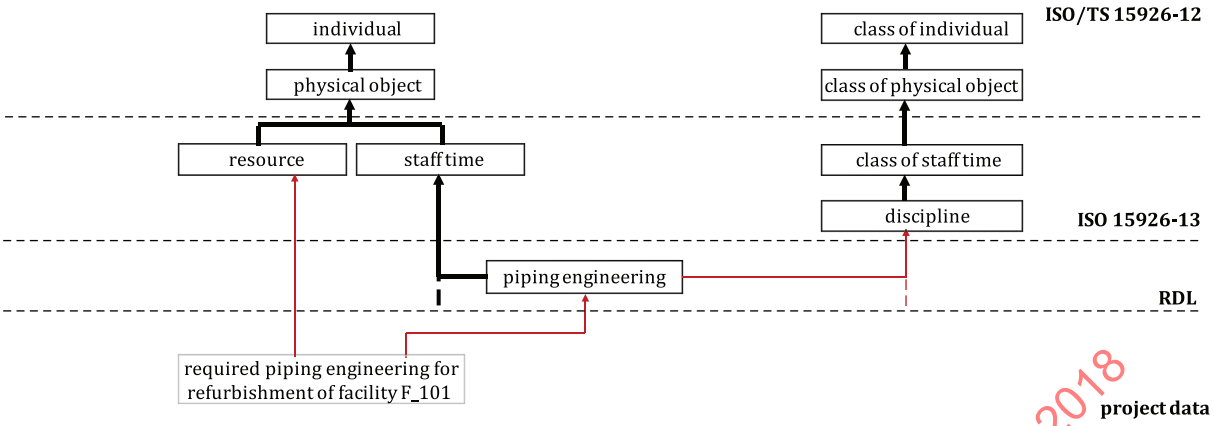

Figure 38 — Discipline

5.8.9 Consumption profile

A **consumption profile** is recorded as a function of how a **resource** is used as an **activity** progresses.

The domain of the function is a percentage of the total time of the **activity**. The range of the function is a percentage of the total amount of the **resource** that is used by that time.

NOTE A consumption profile necessarily starts at (0, 0) and ends at (100, 100) and increases or remains constant in each period.

EXAMPLE For proposed the pouring of concrete in the refurbishment of facility F_101 version 2, 75 % of the concrete mix is used after 50 % of the time. This is recorded by a point (50, 75) in the **consumption profile**. This is shown in Figure 39.

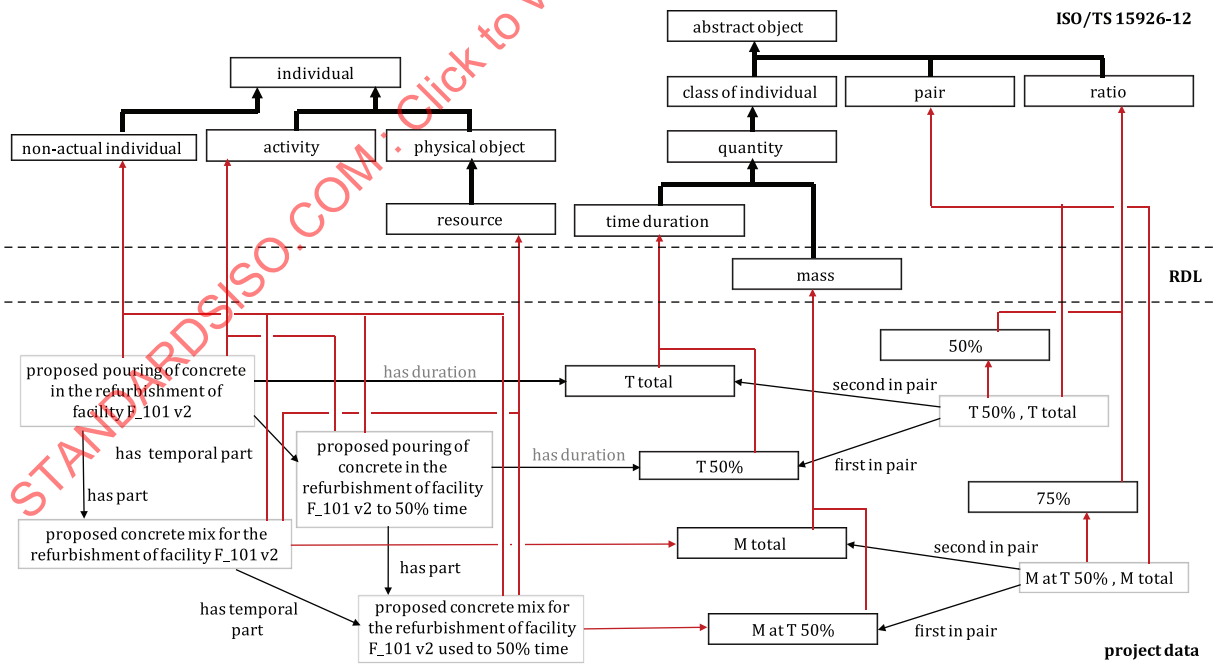

Figure 39 — Point in a consumption profile

A concise encoding of a consumption profile, for inclusion within a **specification** for a **resource** is defined for the scheduling application view model.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.8.10 Material resource availability checking and ordering

Whether or not an **activity** requires a material **resource** is a classification of the **activity** according to an **activity material resource status**, as follows:

— **activity without material resource**;

— **activity with material resource**.

An overall **planning** activity may contain a **check material availability** activity. There are two subclasses of a **check material availability** activity according to the outcome of the check, as follows:

— **check material availability – available**;

— **check material availability – not available**.

A **check material availability** activity has an **availability checked for** relationship with a required **physical object**.

The ordering of the material for a resource is recorded by an **order material** activity. An **order material** activity has an **order placed for** relationship with a required **physical object**.

EXAMPLE The proposed **activity** 'plan for install piping for dehydration train B on UGE-1 version 2' is an **activity with material component**. The planning activity checks material availability and places an order. The objects are as follows:

— 'planning for UGE-1 natural gas capacity upgrade': an **actual individual** and a **planning** activity;

— 'installation of piping for dehydration train B on UGE-1 version 2': a **non-actual individual** and an **activity with material component**;

— 'piping material for dehydration train B on UGE-1 version 2': a **non-actual individual** and a **physical object**;

— 'piping material for dehydration train B on UGE-1 version 2 as resource': a **non-actual individual**, a **resource** and a **physical object**;

— 'check availability of piping material for dehydration train B on UGE-1': an **actual individual** and a **check material availability - available**;

— 'order piping material for dehydration train B on UGE-1': an **actual individual** and an **order material** activity.

These objects, with their classifications and relationships, are shown in Figure 40.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

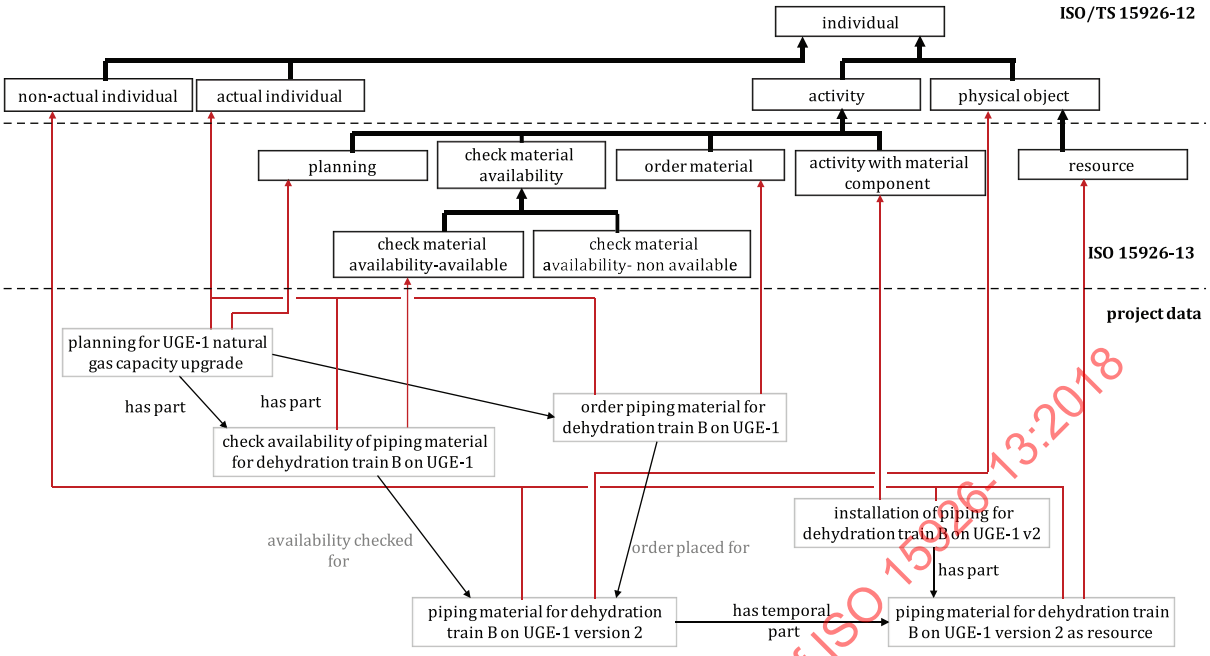

Figure 40 — Check availability and order material

The times and the people involved can be recorded for the **check material availability** and **order material** activities.

5.8.11 Material resource delivery

A **physical object** is delivered by a **deliver material** activity. The progress of the delivery can be recorded by a classification of the delivery activity according to a **material delivery progress status**, as follows:

— **deliver material – on time**;

— **deliver material – delayed**.

The temporal part of a **physical object** being delivered is part of the **deliver material** activity and classified as **material in delivery**.

The location of a **physical object** is recorded by a classification according to a **material delivery location status**, as follows:

— **material delivered to base**;

— **material delivered off-shore**;

— **material delivered on-shore**.

EXAMPLE Following an **order material** activity in the example in 5.8.10, there is actual **physical object**. This **physical object** is delivered on time, and is delivered to base. The objects are as follows:

— 'installation of piping for dehydration train B on UGE-1 version 2': a **non-actual individual** and an **activity with material component**;

— 'piping material for dehydration train B on UGE-1 version 2': a **non-actual individual** and a **physical object**;

— 'piping material for dehydration train B on UGE-1 version 2 as resource': a **non-actual individual**, a **resource** and a **physical object**;

— 'actual piping material for dehydration train B on UGE-1': an **actual individual** and a **physical object**;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

— ‘deliver piping material for dehydration train B on UGE-1’: an **actual individual** and a **deliver material – on time** activity;

— ‘actual piping material for dehydration train B on UGE-1 during delivery’: an **actual individual** and a **material in delivery**;

— ‘actual piping material for dehydration train B on UGE-1 at base’: an **actual individual** and a **material delivered to base**.

These objects, with their classifications and relationships, are shown in Figure 41.

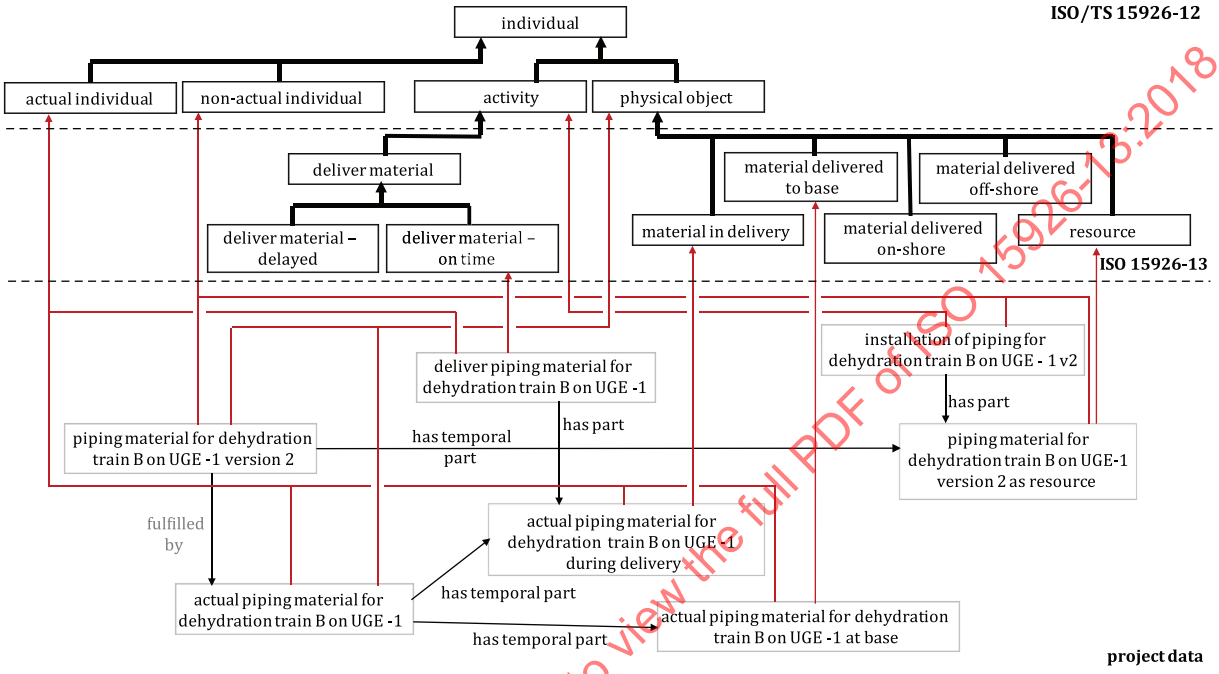

Figure 41 — Deliver material

The time and organization involved can be recorded for the **deliver material** activity. The start and end times can be recorded for temporal part of the **physical object** that is **material delivered to base**.

5.9 Participants in an activity

5.9.1 Subject of work

An **activity** is carried out on a **physical object** that is the **subject of work**.

A **physical object** exists before and after the **activity**, so a **physical object** is a **subject of work** for only part of its life.

NOTE The subject of work for an activity can be specified in general by reference to a whole facility, or in detail by reference to a particular system or equipment item.

EXAMPLE 1 Part of UGE-1 is **subject of work** for the proposed natural gas capacity upgrade **activity**. For a period of time, all of the TEG dehydration system is **subject of work** for the proposed natural gas capacity upgrade **activity**.

The relationships between facility UGE-1, its TEG dehydration system and the proposed natural gas capacity upgrade **activity** are shown as a space-time diagram in Figure 42.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

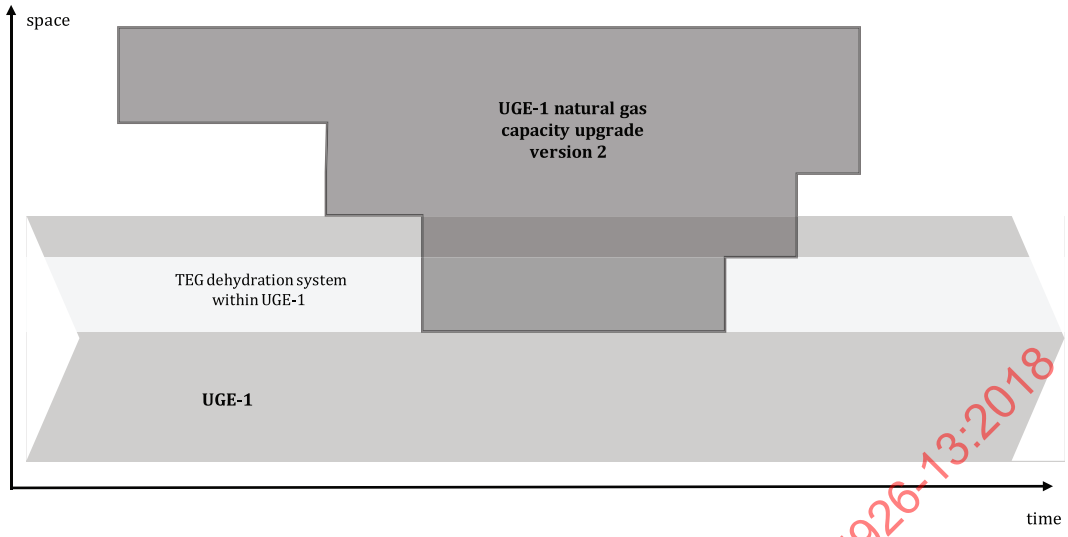

Figure 42 — Subject of work space-time diagram

The space dimension indicates the scope of the physical objects that participate in the activity. The TEG dehydration system does not participate in the activity throughout.

Objects are as follows:

— UGE-1: an **actual individual** and **physical object**;

— UGE-1 TEG dehydration system: an **actual individual** and **physical object**;

— 'UGE-1 natural gas capacity upgrade version 2': a **non-actual individual** and **activity**;

— 'part of UGE-1 participating in natural gas capacity upgrade version 2': a **non-actual individual** and **subject of work**;

— 'temporal part of UGE-1 TEG dehydration system participating in natural gas capacity upgrade version 2': a **non-actual individual** and **subject of work**.

These objects, with their classifications and relationships, are shown in Figure 43.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

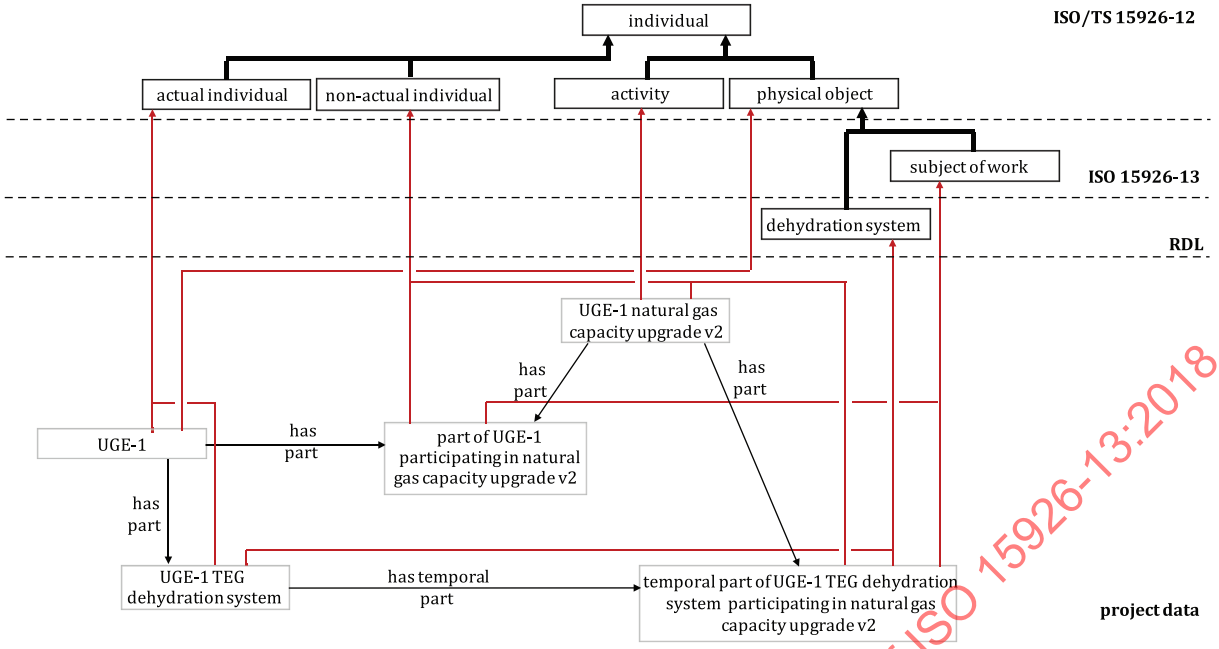

Figure 43 — Subject of work

A record of a physical object that is the **subject of work** of an **activity** may be omitted if a **subject of work** relationships is used.

EXAMPLE 2 A simplification of EXAMPLE 1 by the use of a subject of work relationship is shown in Figure 44.

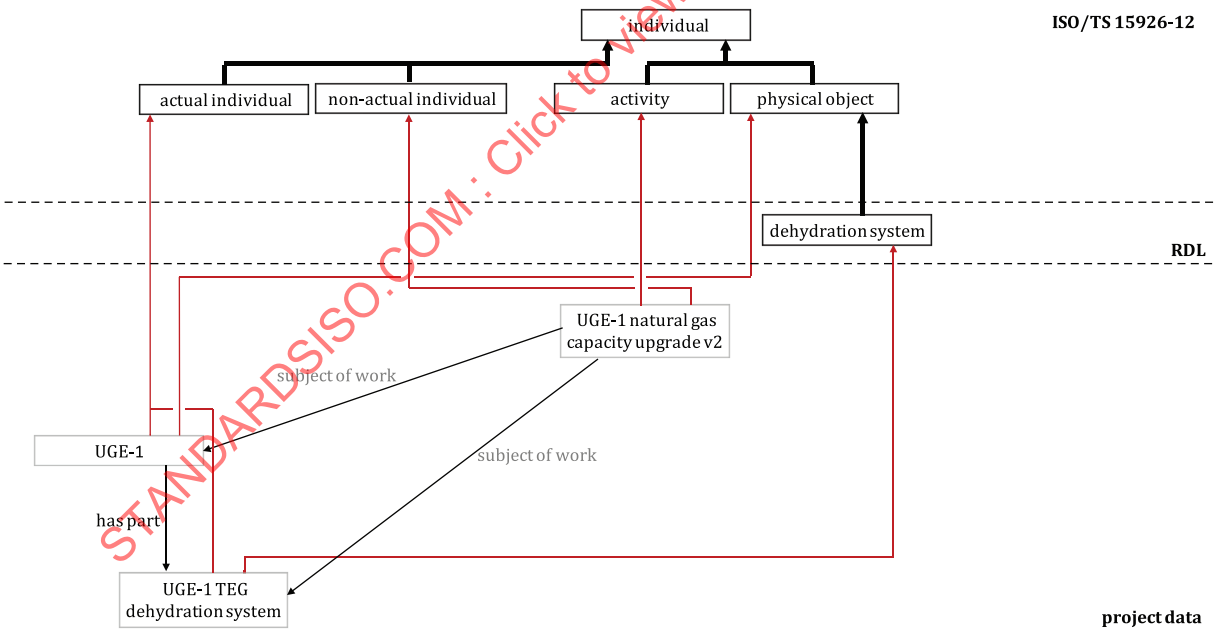

Figure 44 — Subject of work relationship

5.9.2 Subject of work and physical breakdown

A **physical object** that is a **subject of work** may be classified according to its function.

NOTE 1 Classes of **physical object** according to function are not standardized in this document but can be defined in a Reference Data Library. Such classes are usually domain specific.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

The **subject of work** of an **activity** that is a part of a whole may be classified by a **physical breakdown class**.

NOTE 2 **Physical breakdown classes** are not standardized in this document but can be defined in a Reference Data Library.

EXAMPLE **Physical breakdown classes** are defined in ISO 19008.

5.9.3 Role of a person or organization

An **organization** may participate in an **activity** as:

— **operator**;

— **main-contractor**;

— **sub-contractor**.

A **person** or **organization** may participate in an **activity** as:

— **project leader**.

NOTE Other roles for an **organization** or **person** in an **activity** can be defined within a Reference Data Library. Common roles includes "regulator", "project sponsor", "project director", "construction manager", "engineering manager", and "team leader".

EXAMPLE The **person** Fred Bloggs is the proposed "chief engineer" for the proposed **activity** "UGE-1 natural gas capacity upgrade v2". This is shown in Figure 45.

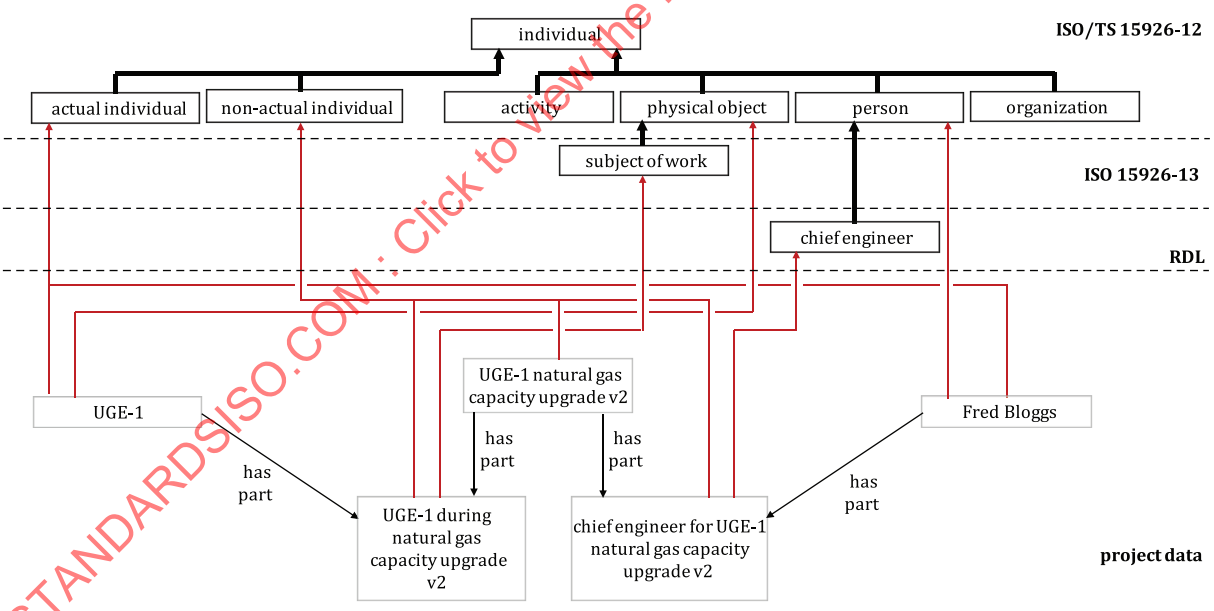

Figure 45 — Role of a person in an activity

Figure 45 assumes that Fred Bloggs is the proposed chief engineer throughout the project. It is were proposed that the chief engineer changed during the project, then:

— the **functional physical object** "chief engineer for UGE-1 natural gas capacity upgrade v2" would have a temporal part "Fred Bloggs as chief engineer for UGE-1 natural gas capacity upgrade v2" with beginning and end dates;

— only the temporal part "Fred Bloggs as chief engineer for UGE-1 natural gas capacity upgrade v2" would be a part of the person "Fred Bloggs".

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.9.4 Planning software

A **planning** activity may be carried out using **installed planning software**.

Installed planning software is a subclass of **physical object**. Subclasses of **installed planning software** may be according to the type and version of the software.

NOTE Subclasses of **installed planning software** are not defined in this document, but can be defined within a Reference Data Library. A common subclass is "Microsoft Project". Different versions of Microsoft Project are subclasses of this.

5.10 Shutdown

5.10.1 Shutdown phase

An **activity** that has a **shutdown** as a part is divided into **shutdown phases** as follows:

— **activity before running down**;

— **running down**;

— **activity between running down and starting up**;

— **starting up**;

— **activity after starting up**.

EXAMPLE The proposed **activity** 'scheduled maintenance of platform UGE-1 in May 2015 version 2' has a **shutdown** as a part. This **activity** has the phase 'scheduled maintenance of platform UGE-1 in May 2015 whilst shutdown version 2' which is a member of **activity between running down and starting up**.

5.10.2 Necessary shutdown for an activity

An **activity** is classified according whether or not it is necessarily part of an **activity between shutdown and start-up**. The following are members of **class of activity by shutdown requirement**:

— **activity independent of shutdown**;

— **activity requiring shutdown**.

EXAMPLE The proposed **activity** 'required replacement of the instrumentation of the flare tip of platform UGE-1 version 2' is part of the scheduled maintenance of platform UGE-1 in May 2015, and is an **activity requiring shutdown**. Therefore this **activity** is part of the **activity between shutdown and start-up** 'scheduled maintenance of platform UGE-1 in May 2015 whilst shutdown version 2'.

A **class of activity** can be classified according whether or not its members are necessarily part of an **activity whilst shutdown**. The following are members of **class of class of activity by shutdown requirement**:

— **class of activity independent of shutdown**;

— **class of activity requiring shutdown**;

— **class of activity possibly requiring shutdown**.

NOTE A **specification** and a **class of activity** can be classified according whether or not its members are necessarily part of an **activity whilst shutdown**.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.10.3 Shutdown scope

A **shutdown** activity has a temporal part of a **physical object** as its **subject of work**. The classification of the **physical object** may place requirements on the nature of the shutdown.

NOTE 1 Subclasses of **physical object** relevant to the nature of a **shutdown** are not standardized in this document but can be defined in a Reference Data Library. Such classes are usually domain specific. Subclasses of **physical object** that are of significance to an oil and gas exploration and production shutdown include:

— system;

— system train;

— equipment;

— field;

— living quarters;

— plant.

A **shutdown** activity can cause the end of another **activity**. The classification of the **activity** that is ended may place requirements on the nature of the **shutdown**.

NOTE 2 Subclasses of **activity** relevant to the nature of a **shutdown** are not standardized in this document but can be defined in a Reference Data Library. Such classes are usually domain specific. Subclasses of **activity** that are of significance to an oil and gas exploration and production shutdown include:

— drilling;

— gas export;

— gas injection;

— oil and gas production;

— water injection;

— water production.

5.10.4 Shutdown reason

A **shutdown** is classified according to reason. The following subclasses of **shutdown** are members of **class of shutdown by reason**:

— **emergency shutdown**;

— **safety test shutdown**;

— **mini shutdown**;

— **revision shutdown**.

NOTE Additional members of **class of shutdown by reason**, such as “cycle ending turnaround” and “non-cycle ending turnaround” can be defined in a Reference Data Library.

A **shutdown** can be classified according to whether or not it has been planned. The following subclasses of **shutdown** are members of **class of shutdown by prior intent**:

— **unplanned shutdown**;

— **planned shutdown**.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

EXAMPLE The proposed **activity** 'scheduled maintenance of UGE-1 in May 2015 version 2' has the **shutdown** 'production shutdown of UGE-1 in May 2015 version 2'as a part. This **shutdown** is a **planned shutdown** and a **mini shutdown**. This shutdown causes an end to the **activity** 'production on UGE-1 in May 2015'. Objects are as follows:

— 'production on UGE-1 in May 2015': an **activity** and **actual individual**;

— 'scheduled maintenance on UGE-1 in May 2015 version 2': an **activity** and **non-actual individual**;

— 'production shutdown on UGE-1 in May 2015 version 2': a **scheduled shutdown**, a **mini shutdown** and a **non-actual individual**;

— 'end of production on UGE-1 in May 2015 version 2': an **event** and **non-actual individual**;

— 'scheduled maintenance on UGE-1 in May 2015 whilst shutdown version 2': an **activity between shutdown and start-up** and **non-actual individual**;

— 'replacement of the instrumentation of the flare tip of UGE-1 version 2': an **activity** and **non-actual individual**.

These objects, with their classifications and relationships, are shown in Figure 46.

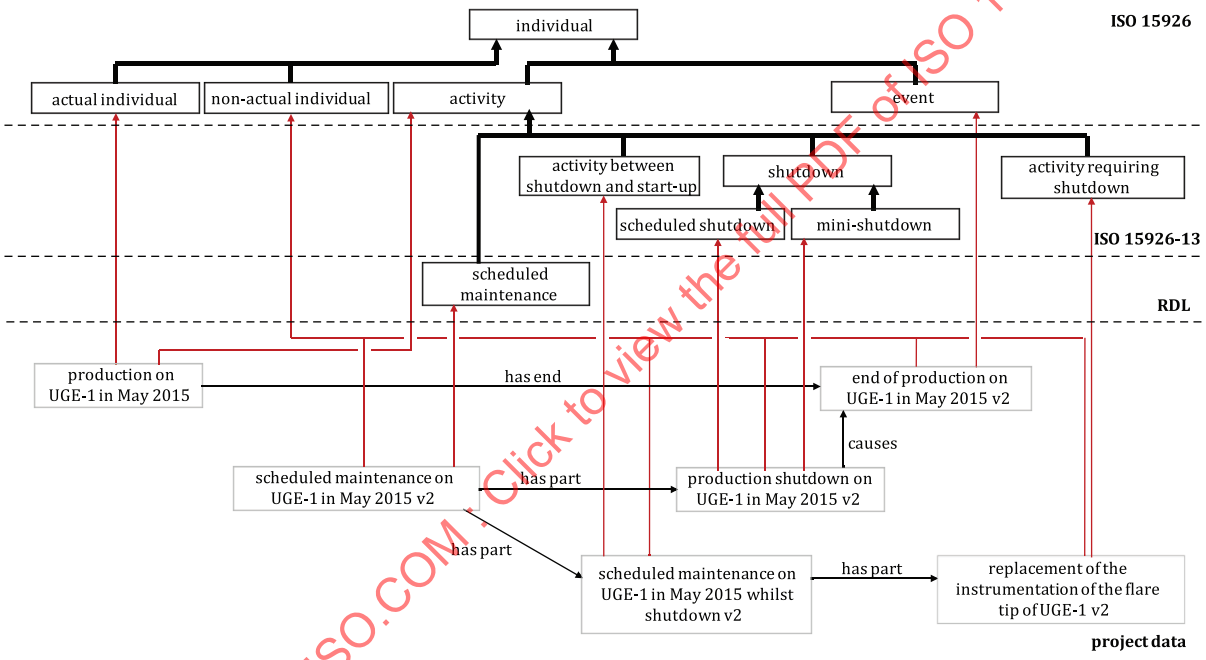

Figure 46 — Activity shutdown type

5.11 Dates and times for an activity

5.11.1 Beginning and end events for an activity

An **activity** has beginning and end **events**. The **point in time** of an **event**, or a **period in time** that contains an **event** may be recorded.

NOTE 1 A **point in time** can be identified by an **ISO 8601 identification of point in time**. The property **ISO 8601 identification of point in time** is defined in ISO/TS 15926-12.

NOTE 2 A **period in time** can be described by an **ISO 8601 identification of period in time**. A **period in time** can also be defined by a beginning and end **point in time**. The property **ISO 8601 identification of period in time** is defined in ISO/TS 15926-12.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

A **period in time** may have both a beginning and an end, or have no beginning or no end. The following subclasses of **period in time** are defined:

— **period of time with definite beginning and end**;

— **period of time with indefinite beginning**;

— **period of time with indefinite end**.

5.11.2 Required beginnings and ends

A required **activity** has required beginning and end **events**. The **periods in time** that contain these **events** may be specified.

NOTE Dates that are commonly specified for a required **activity** are shown in Table 1, along with their commonly used initializations.

Table 1 — Dates specified for a required activity

Initialization	Name	Representation
MSO	must start on date	beginning **event** is part of a **period of time** that is the specified **calendar day**
MFO	must finish on date	end **event** is part of a **period of time** that is the specified **calendar day**
SNET	start no earlier than date	beginning **event** is part of a **period of time** that begins at the beginning of the specified **calendar day**
SNLT	start no later than date	beginning **event** is part of a **period of time** that ends at the end of the specified **calendar day**
FNET	finish no earlier than date	end **event** is part of a **period of time** that begins at the beginning of the specified **calendar day**
FNLT	finish no later than date	end **event** is part of a **period of time** that ends at the end of the specified **calendar day**

EXAMPLE The required **activity** 'UGE-1 natural gas capacity upgrade' is required to start no later than the 30th June 2016. Object are as follows:

— 'UGE-1 natural gas capacity upgrade': an **activity** and **non-actual individual**;

— 'UGE-1 natural gas capacity upgrade beginning': an **event** and an **non-actual individual**;

— 'before 1st June 2016': a **period in time with indefinite beginning**;

— '2016-06-01T00:00Z': a **point in time**.

These objects, with their classifications and relationships, are shown in Figure 47.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

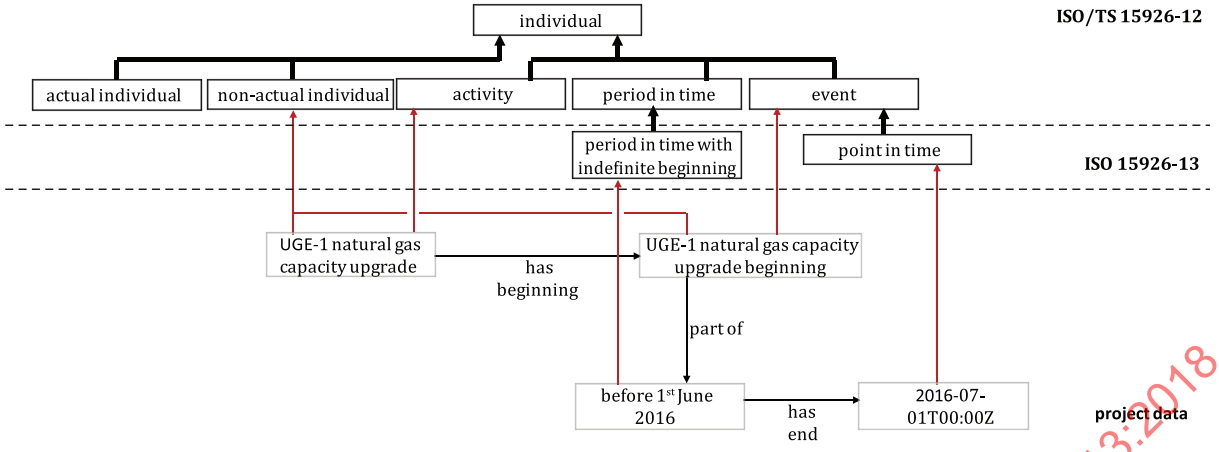

Figure 47 — Required beginning

5.11.3 Required as early or as late as possible

A planning **activity** may require a beginning or end **event** to be as early or as late as possible.

The following relationships are defined between a planning activity and an event:

— **required as early as possible**;

— **required as late as possible**.

EXAMPLE Planning for **activity** 'UGE-1 natural gas capacity upgrade' requires that it ends as early as possible. Objects are as follows:

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity and an **actual individual**;

— 'UGE-1 natural gas capacity upgrade': an **activity** and a **non-actual individual**;

— 'UGE-1 natural gas capacity upgrade end': an **event** and a **non-actual individual**.

These objects, with their classifications and relationships, are shown in Figure 48.

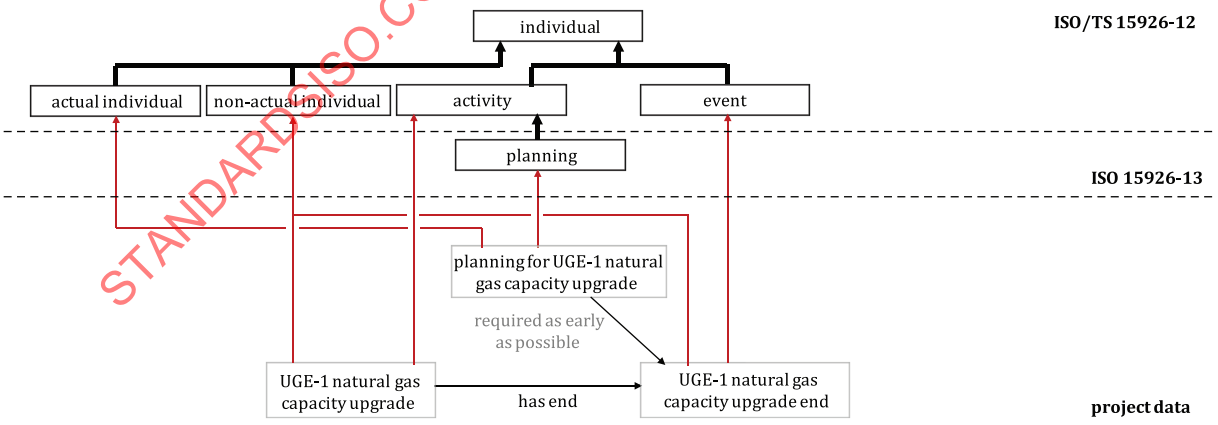

Figure 48 — Required as early as possible

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.11.4 Proposed beginnings and ends

A proposed **activity** has proposed beginning and end **events**. The **periods in time** that contain these **events** may be specified.

NOTE 1 The information about the beginning and end **events** of a proposed **activity** can be contained in a **schedule**.

NOTE 2 The dates and times of proposed beginning and end **events** are usually calculated by planning software.

NOTE 3 Dates that are commonly specified for a proposed **activity** are shown in Table 2 along with their commonly used initializations.

Table 2 — Plan for activity dates

Initialization	Name	Representation
ES	early start date	beginning **event** is part of a **period of time** that begins at the beginning of the specified **calendar day**
LS	late start date	beginning **event** is part of a **period of time** that ends at the end of the specified **calendar day**
EF	early finish date	end **event** is part of a **period of time** that begins at the beginning of the specified **calendar day**
LF	late finish date	end **event** is part of a **period of time** that ends at the end of the specified **calendar day**

EXAMPLE The proposed **activity** 'UGE-1 natural gas capacity upgrade version 2' specifies a beginning between the 10th and 22nd June 2016. Objects are as follows:

— 'UGE-1 natural gas capacity upgrade version 2': an **activity** and **non-actual individual**;

— 'UGE-1 natural gas capacity upgrade beginning version 2': an **event** and **non-actual individual**;

— '10th to 22nd June 2016': a **period in time with definite beginning and end**;

— '2016-06-10T00:00Z': a **point in time**;

— '2016-06-22T24:00Z': a **point in time**.

These objects, with their classifications and relationships, are shown in Figure 49.

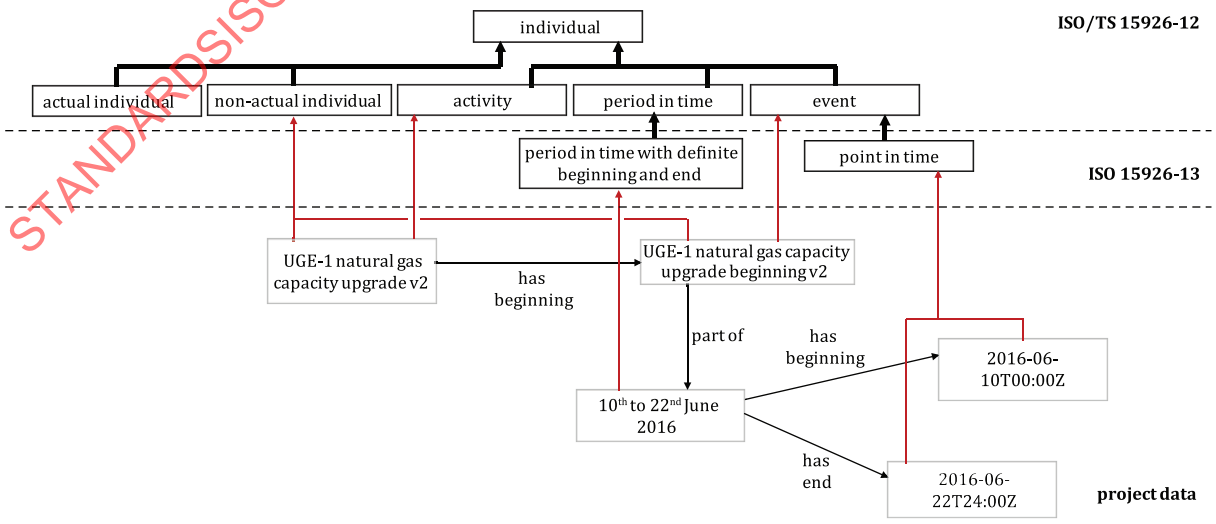

Figure 49 — Proposed beginning

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.11.5 Actual beginnings and ends

An **actual activity** has an actual beginning **event** and an actual end **event**.

A **period of time** that contains an actual beginning or end **event** can be recorded.

EXAMPLE The actual **activity** 'actual UGE-1 natural gas capacity upgrade' starts on 15th June 2015. Objects that record this are as follows:

— 'actual UGE-1 natural gas capacity upgrade': an **actual activity**;

— 'actual UGE-1 natural gas capacity upgrade beginning': an **event** and an **actual individual**;

— '15th June 2015': a **period in time** and a **calendar day**.

These objects, with their classifications and relationships, are shown in Figure 50.

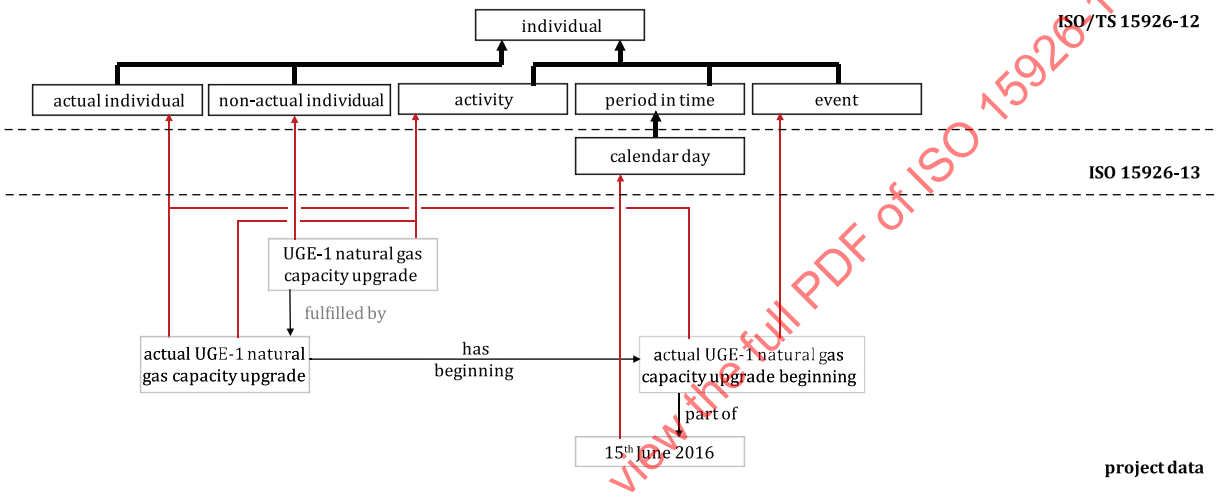

Figure 50 — Actual beginning

5.12 Duration of an activity

The duration of an **activity** is the total amount of time during which the **activity** continues. This is recorded by a **has duration** relationship with a **time duration**.

NOTE The **physical quantity** that is **time duration** is defined in ISO/TS 15926-12. In text, the term "duration" when not shown in bold has its normal English language meaning.

If an **activity** has a calendar of working times, then the duration is the sum of the working times within the calendar during which the **activity** continues.

EXAMPLE 1 The activity 'pour concrete for the refurbishment of facility F_101' has a calendar. This activity is divided into four parts 'A', 'B', 'C' and 'D', which are separated by non-working times. The duration of the activity is the sum of the durations of the parts A, B, C and D, as shown in Figure 51.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

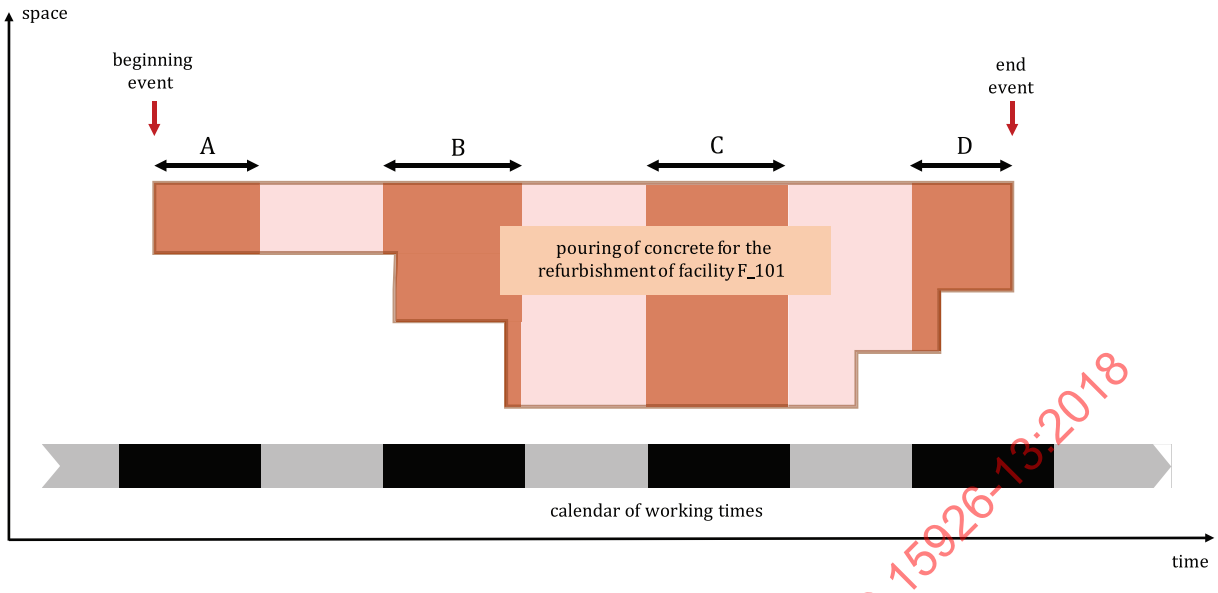

Figure 51 — Duration of an activity with a calendar

The proposed pouring of concrete activity has duration of 50 hours. The actual pouring of concrete activity has a duration of 51 hours. Objects are as follows:

— ‘pouring concrete for refurbishment of facility F_101 version 2’: an **activity**;

— ‘actual pouring concrete for refurbishment of facility F_101’: an **actual activity**;

— ‘50 hours’: a **time duration**;

— ‘51 hours’: a **time duration**.

These objects, with their classifications and relationships, are shown in Figure 52.

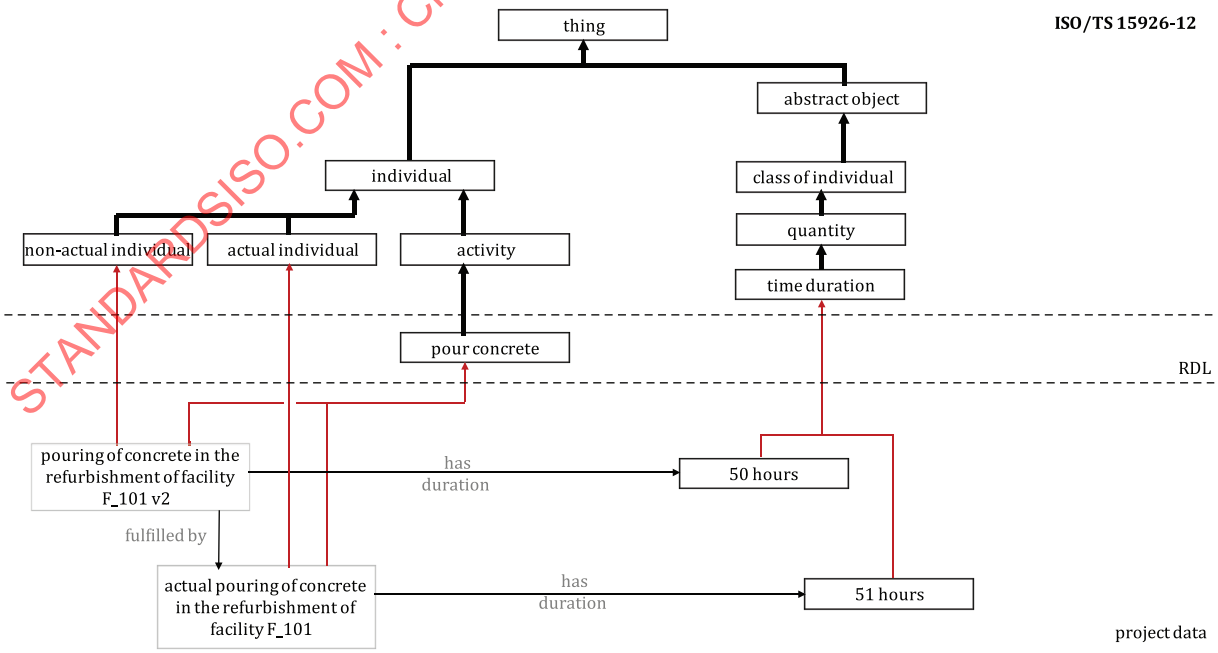

Figure 52 — Duration of activity

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

The duration of a temporal part of the **actual activity** can be recorded.

EXAMPLE 2 Up to 2015-02-04, the duration of the 'actual pouring concrete for refurbishment of facility F_101' activity, defined in EXAMPLE 1, is 12,5 hours. This is 25 % of the planned duration. The additional objects to record this information are as follows:

— 'actual pouring concrete for refurbishment of facility F_101 to 2015-02-04': an **actual activity** and a member of 'pouring concrete';

— '12,5 hours': a **time duration**.

These objects, with their classifications and relationships, are shown in Figure 53.

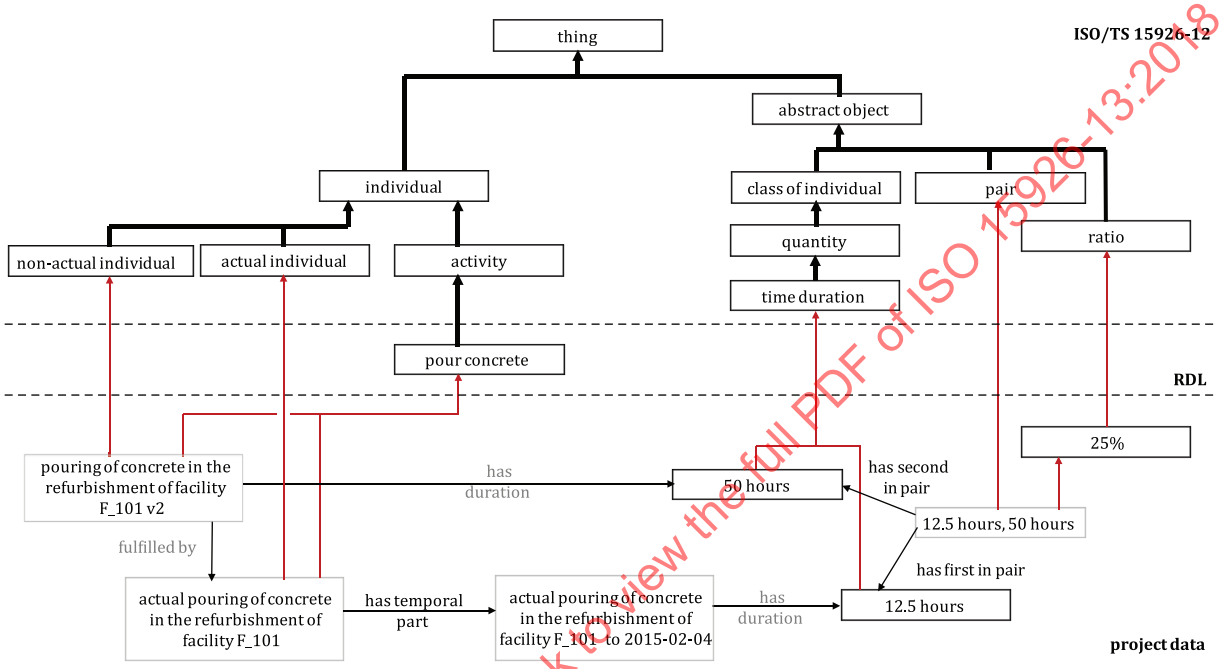

Figure 53 — Duration of activity to date

5.13 Measure of progress

5.13.1 Frontline date

The "frontline date" for a proposed **activity** is the date upon which achieved progress was scheduled.

An actual **activity** has measure of progress. A proposed **activity** can be partitioned into the part that corresponds to the progress of the actual **activity** according to the measure, and to the part that remains to be done.

The frontline date is the date of the end of the part of the proposed **activity** that corresponds to the progress of the actual **activity**. If the frontline date is before the date to which the progress of the actual **activity** is reported, then the **activity** is behind schedule.

EXAMPLE The pouring of concrete for the refurbishment of facility F_101 is reported to 2015-02-04. The measure of progress is the amount of concrete mix used. According to the proposal version 2, this amount of concrete mix should have been used by 2015-02-03. Hence the frontline date for the **activity** is 2015-02-03, whilst the actual date is 2015-02-04.

The objects in proposal version 2 are as follows:

— 'pouring concrete for refurbishment of facility F_101 version 2': an **activity** and **non-actual individual**;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

— ‘pouring concrete for refurbishment of facility F_101 version 2 to 2015-02-03’: an **activity** and **non-actual individual**;

— ‘concrete mix resource for use to 2015-02-03 in version 2’: a **resource** and **non-actual individual**.

The actual objects are as follows:

— ‘actual pouring concrete for refurbishment of facility F_101’: an **activity** and **actual individual**;

— ‘actual pouring concrete for refurbishment of facility F_101 to 2015-02-04’: an **activity** and **actual individual**;

— ‘actual concrete mix resource used to 2015-02-04’: a **resource** and **actual individual**.

The objects, with their classifications and relationships, are shown in Figure 54.

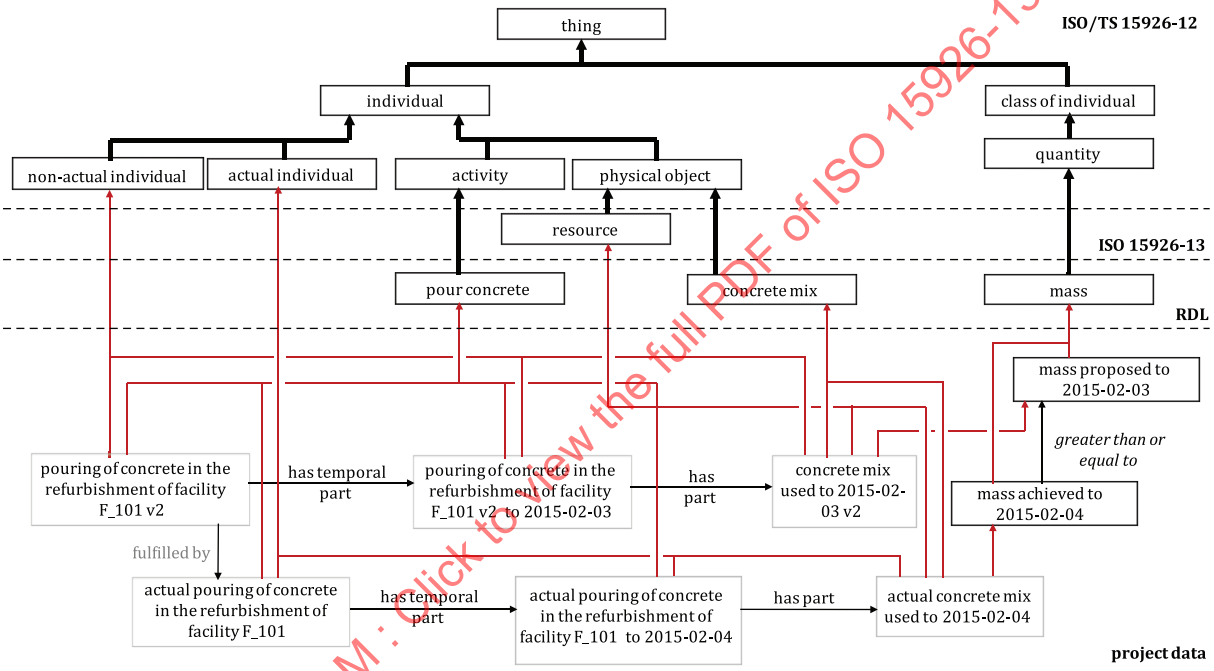

Figure 54 — Frontline date

5.13.2 Performance measurement

A **performance evaluating** activity contains **earned value calculating** activities that calculate measures of progress for an actual **activity**. Each **earned value calculating** activity may be classified according to the **earned value method** that is used.

The following is an **earned value method**:

— **always on schedule**: the percentage complete is always according to the proposed timing for the **activity**.

NOTE 1 An **always on schedule** method is usually used for activities such as providing safety cover that do not have milestones or specific deliverables.

NOTE 2 Other **earned value methods** can be defined within a Reference Data Library. Common methods include:

— earned value 0/100: 100 % is earned when an **activity** is completed, but nothing is earned before.

— earned value 20/80: 20 % is earned when an **activity** begins, and the remain 80 % is eared when an **activity** is completed.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

A **performance evaluating** activity has a **uses method** relationship with an **earned value method**.

EXAMPLE The **planning** activity for the refurbishment of facility F-101 contains a **performance evaluating** activity for the pouring of concrete which uses the "earned value 20/80" method. This is shown in Figure 55.

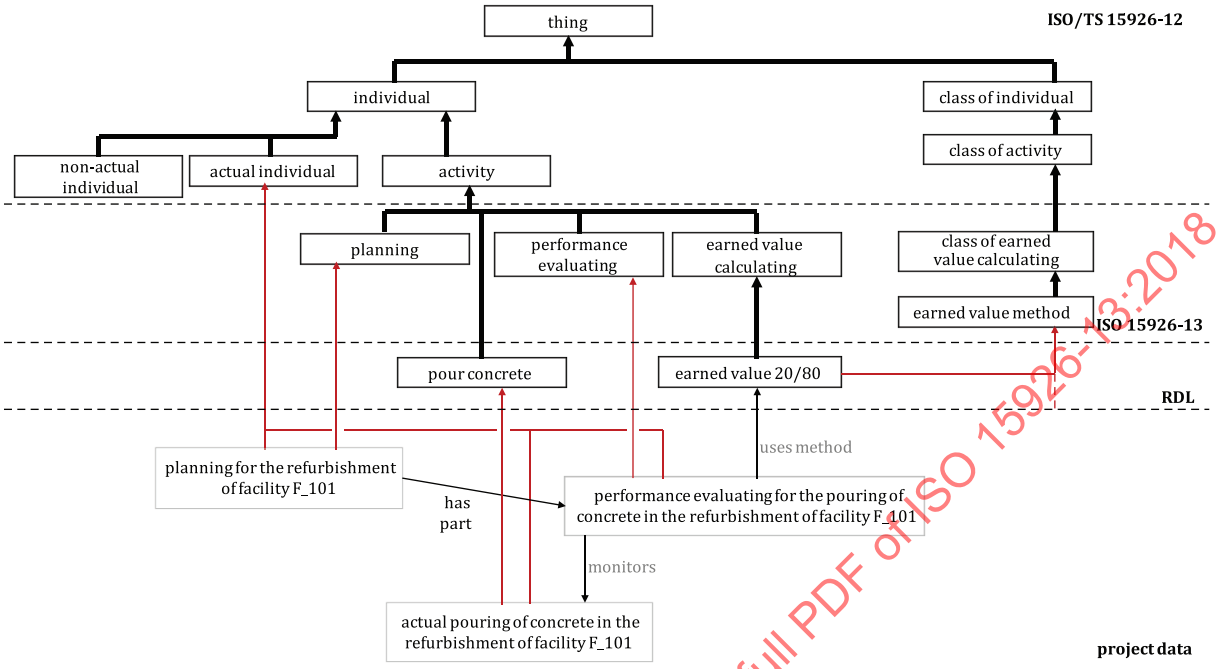

Figure 55 — Performance measurement

5.14 Event and milestone

An **event** may be:

— the beginning or end of an **activity**;

— at a stage within an **activity** defined by a metric such as activity duration, staff time, expenditure or material use;

— separated by a **period in time** from another **event**;

— the earliest or latest of a set of **events**.

An **event** may be a "milestone" for a **planning** activity. A **has milestone** relationship specified that a **planning** activity regards an **event** as a milestone.

An **event** may be a milestone for a **decision gate** activity.

EXAMPLE 1 The **planning** activity 'planning for UGE-1 natural gas capacity upgrade' has 'completion of installation of piping for dehydration train B on UGE-1' as a milestone. The objects are as follows:

— 'planning for UGE-1 natural gas capacity upgrade': a **planning** activity and an **actual individual**;

— 'UGE-1 natural gas capacity upgrade': an **activity** and a **non-actual individual**;

— 'installation of piping for dehydration train B on UGE-1': an **activity** and a **non-actual individual**;

— 'completion of installation of piping for dehydration train B on UGE-1': an **event** and a **non-actual individual**.

— These objects, with their classifications and relationships, are shown in Figure 56.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

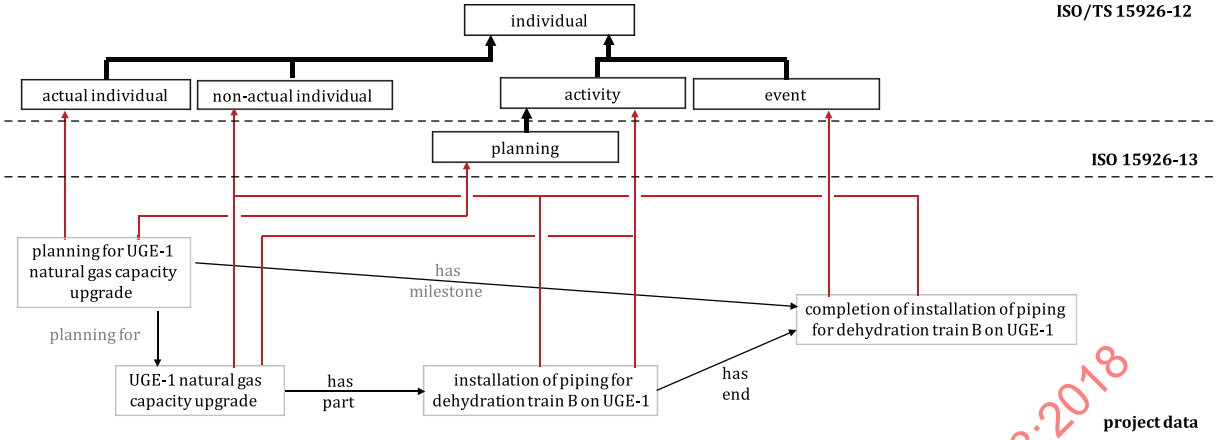

Figure 56 — Activity and milestone

EXAMPLE 2 The **specification** for a **point in time** 'specification for 28 days after the completion of pouring concrete for refurbishment of facility F_101 version 2' is 28 days after the **event** 'completion of pouring concrete for refurbishment of facility F_101 version 2'. Objects are as follows:

— 'pouring concrete for refurbishment of facility F_101 version 2': an **activity** and a **non-actual individual**;

— 'completion of pouring concrete for refurbishment of facility F_101 version 2': an **event** and a **non-actual individual** (which has **specification** 'specification for completion of pouring concrete for refurbishment of facility F_101 version 2' at **specification** for **point in time** T_1);

— 'specification for 28 day period beginning with the completion of pouring concrete for refurbishment of facility F_101 version 2': a **specification** and **class of period in time**;

— 'specification for 28 days after completion of pouring concrete for refurbishment of facility F_101 version 2': **specification** and **class of point in time**.

These objects, with their classifications and relationships, are shown in Figure 57.

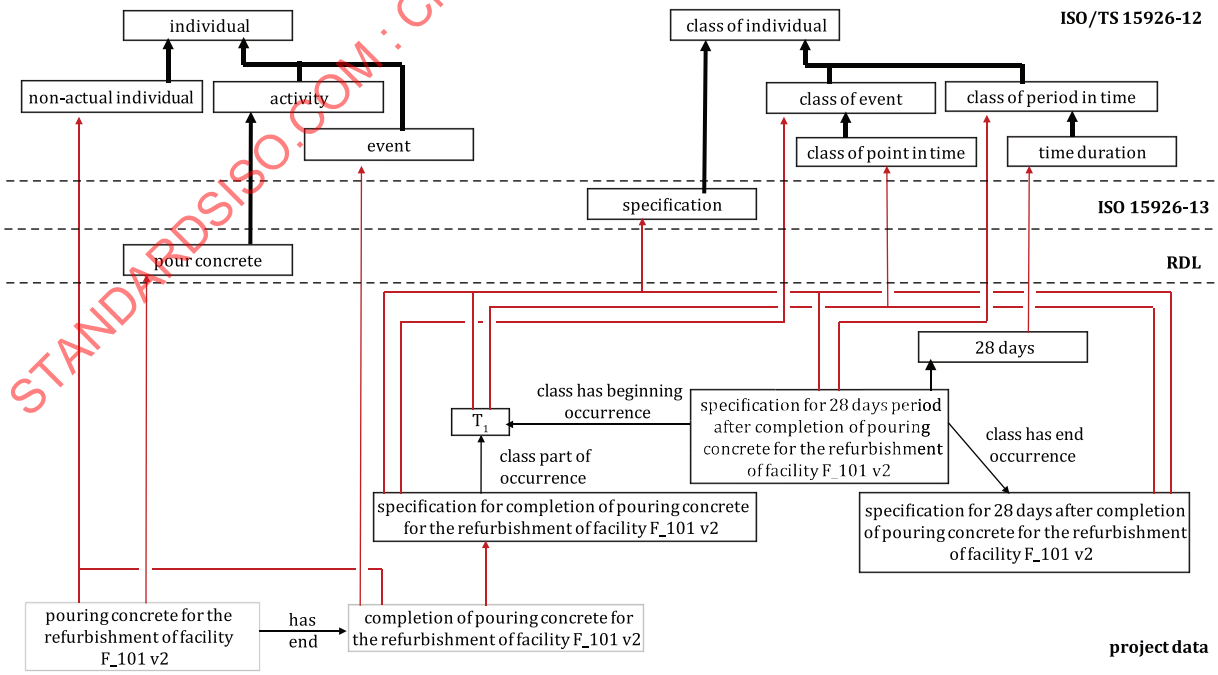

Figure 57 — End of a period in time after an event

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

5.15 Temporal relationships between activities and events

5.15.1 Succession relationship

There may be succession relationships between **events**.

NOTE 1 In many cases, an **event** is the beginning or end of an **activity**, so that there are "succession relationships" between **activities** as shown in Table 3.

Table 3 — Plan succession links between activities

Initialization	Name	Representation
SS	start to start	beginning **event** of one **activity** has a temporal relationship with the beginning **event** of another
SF	start to finish	beginning **event** of one **activity** has a temporal relationship with the end **event** of another
FS	finish to start	end **event** of one **activity** has a temporal relationship with the beginning **event** of another
FF	finish to finish	end **event** of one **activity** has a temporal relationship with the end **event** of another

A succession relationship defines a **class of period in time** that separates **specifications** for **points in time** that contain the **events**. If no minimum duration is specified for this **class of period of time**, then it may be very short and defines only a sequence for the **events**.

NOTE 2 A **plan succession link** corresponds to the element "ProjectScheduleTaskRelationship" in the UN/CEFACT XML schema (see Annex G).

EXAMPLE The **event** 'start of pouring of concrete for the refurbishment of facility F_101 version 2' is constrained to follow the **event** 'completion of erection of shuttering for the refurbishment of facility F_101 version 2'. This is a "Finish to Start" (FS) constraint.

The objects that define the times of the beginning and ends of the **activities** are as follows:

— 'erection of shuttering for refurbishment of facility F_101 version 2': an **activity** and **non-actual individual**;

— 'completion of erection of shuttering for refurbishment of facility F_101 version 2': an **event** and **non-actual individual** (which has **specification** 'specification for completion of erection of shuttering for refurbishment of facility F_101 version 2' at **specification** and **class of point in time** T_1);

— 'pouring concrete for refurbishment of facility F_101 version 2': an **activity** and **non-actual individual**;

— 'start of pouring concrete for refurbishment of facility F_101 version 2': an **event** and **non-actual individual** (which has **specification** 'specification for start of pouring of concrete for refurbishment of facility F_101 version 2' at **specification** and **class of point in time** T_2);

— 'specification for period of time between completion of erection of shuttering and start of pouring of concrete for refurbishment of facility F_101 v2': a **specification** and **class of period in time**.

The objects with their classifications and relationships are shown in Figure 58.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

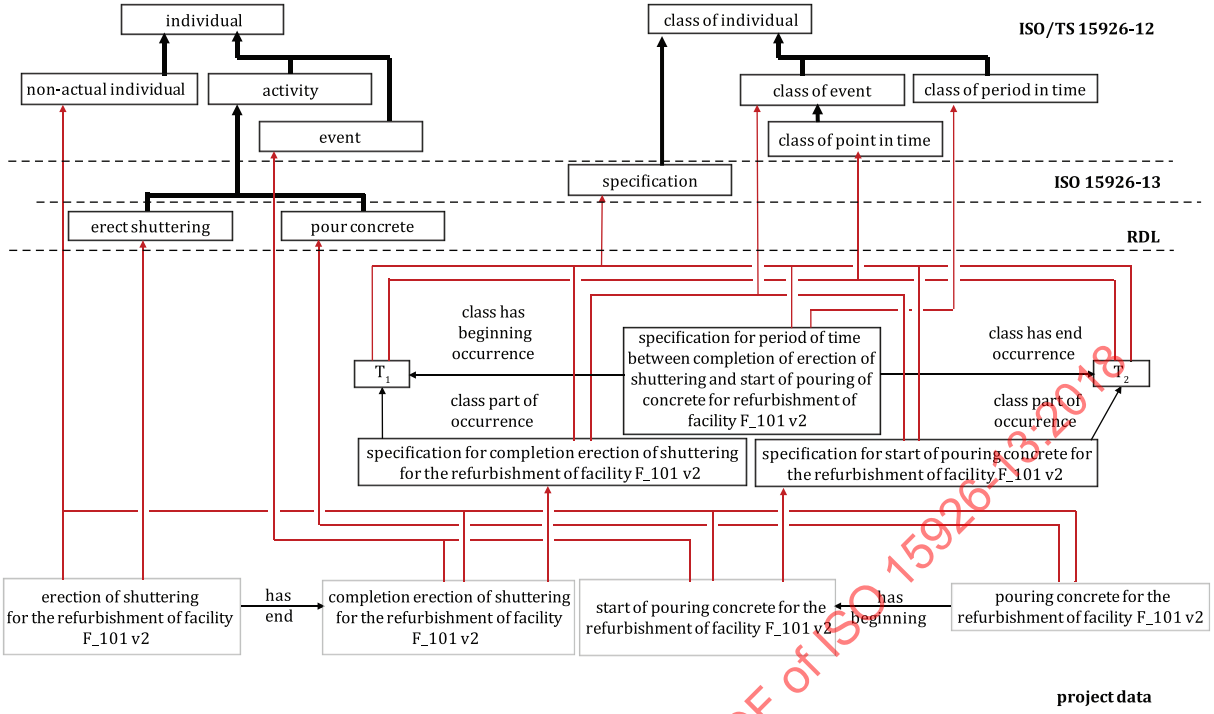

Figure 58 — Finish to start succession relationship

5.15.2 Specified lag for a succession relationship

A **period of time** that separates **events** is called a "lag". This **period of time** may be constrained to have a duration within a range.

A **range time duration** may be defined by a **time duration** that is its upper bound and a **time duration** that is its lower bound.

NOTE A **time duration** can be specified in terms of a **duration scale** such as **hour** or an **ISO 8601 duration description**.

EXAMPLE The **event** 'start of striking shuttering for the refurbishment of facility F_101 version 2' is constrained to be at least 72 hours after the **event** 'completion of pouring concrete for the refurbishment of facility F_101 version 2'. This is a "Finish to Start" (FS) constraint, with a lag of 72 hours or more.

Subsequently the removal of the shuttering from site is constrained to be within 7 working days of the finish of pouring concrete. This is a "Finish to Finish" (FF) constraint with a lag of 7 working days or less. The relationships between the activities of pouring concrete, striking shuttering and removing shuttering from site are shown in Figure 59.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

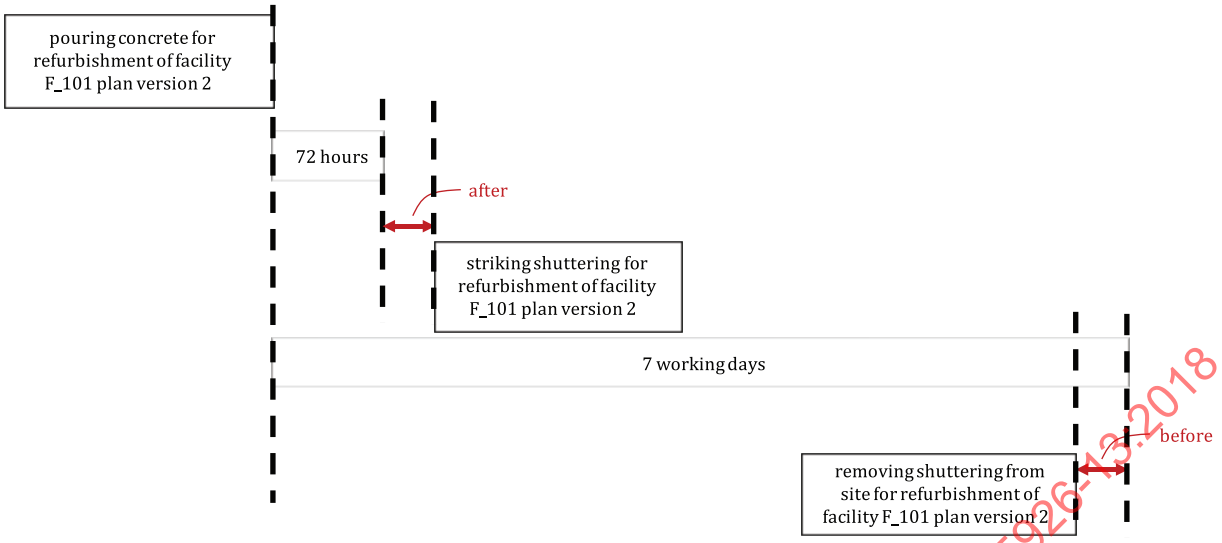

Figure 59 — Sequence of activities

The relationship between the end time of the pouring concrete and the beginning time of striking shuttering activities is defined in terms of their specifications as follows:

— 'specification for completion of pouring concrete for refurbishment of facility F_101 version 2': a **specification** and **class of event** (at **specification** and **class of point in time** T_1);

— 'specification for beginning of striking shuttering for refurbishment of facility F_101 version 2': a **specification** and **class of event** (at **specification** and **class of point in time** T_2).

The separation between T_1 and T_2 is

— 'specification for period between time of completion of pouring of concrete and time of start of striking of shuttering version 2': a **specification** and **class of period of time**.

These objects with their classifications and relationships, are shown in Figure 60.

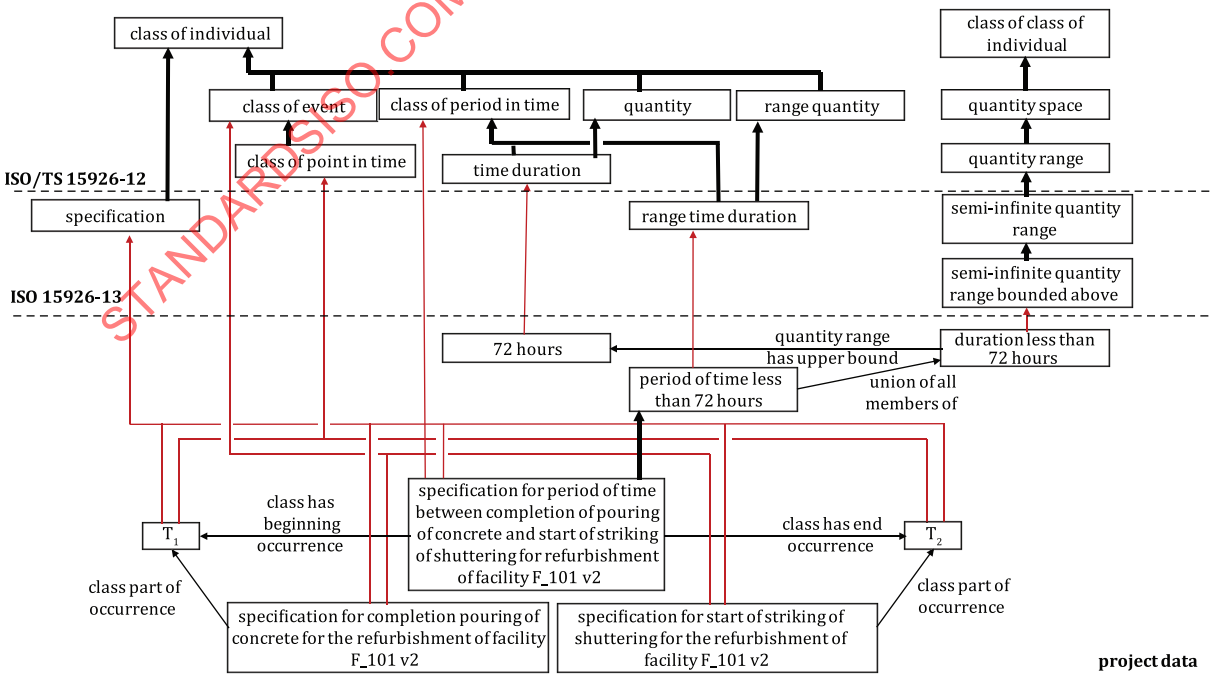

Figure 60 — Finish to start succession relationship with lag

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

5.15.3 Specified lag with calendar for a succession relationship

A **period of time** that is a lag may be constrained to be within a **calendar** of working times.

If a **period of time** is within a **calendar**, then its duration is the sum of the working times within the calendar.

If a **period of time** is within a **calendar**, then its duration may be specified in terms of working days, as follows:

— if a **period in time** begins and ends within the same working day it is a member of **period in time within a working day**;

— if a **period in time** ends within a subsequent working day it is has a **number of working days** relationship with an integer, where 1 indicates the next working day.

EXAMPLE The **event** 'completion of removing shuttering from site for the refurbishment of facility F_101 version 2' is constrained to be within 7 working days of the **event** 'completion of pouring concrete for the refurbishment of facility F_101 version 2'. This is a "Finish to Finish" (FF) constraint, with a lag of 7 working days or less. The working days are defined by the 'civil engineering works calendar'.

Following the approach of the example in 5.15.2, the lag is expressed as:

— 'specification for period between time of completion of pouring of concrete and time of completion of removal of shuttering from site for refurbishment of facility F_101 version 2': a **specification** and **class of period of time**.

The lag is defined by:

— 'civil engineering works calendar': a **calendar**;

— 'period in time less than 7 working days in civil engineering works calendar': a **class of period in time**.

The objects that define the **calendar** and **class of period in time** for the lag are shown in Figure 61.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

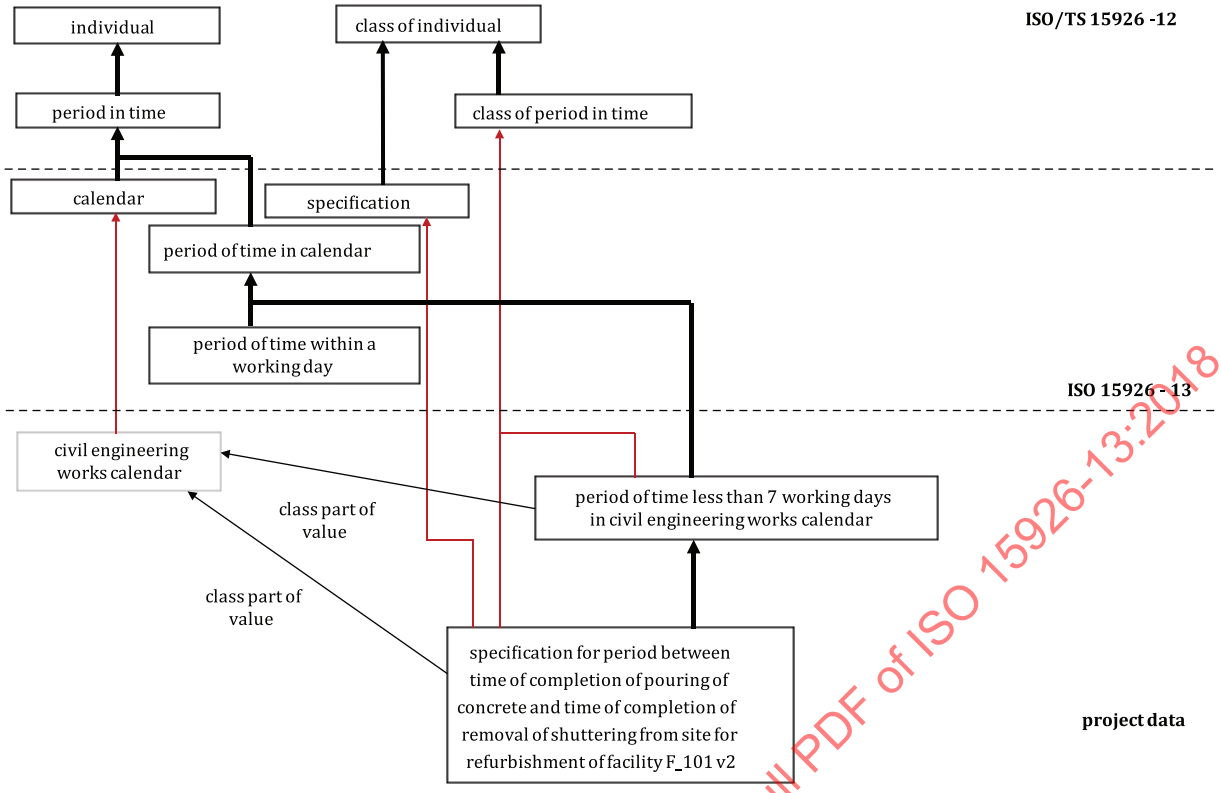

Figure 61 — Finish to finish succession relationship with lag defined by working days

5.15.4 Free float and total float for an activity in plan

The **free float** for a part **activity** is the extension that would not cause a delay to any subsequent **activities** within the whole.

The **total float** for a part **activity** is the extension that would not cause a delay to the completion of the whole.

The **event** at the end of an **activity** is at the beginning of its **free float** and **total float**.

Activities can be nested, so it may be ambiguous as to which whole a float is relevant. A **free float** or **total float** can have **float for** relationship with a whole **activity** to remove this ambiguity.

A **free float** or **total float** can have a calendar. The duration of a **free float** or **total float** is specified in the same way as the **duration** of a lag for a succession relationship.

EXAMPLE The proposed **activity** 'pouring of concrete for the refurbishment of facility F_101 version 2' has a **free float** within the proposed whole **activity** 'refurbishment of facility F_101 version 2' of 3 working days. The working days are defined by the 'civil engineering works calendar.

The objects that define the **free float**, with their classifications and relationships, are shown in Figure 62.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

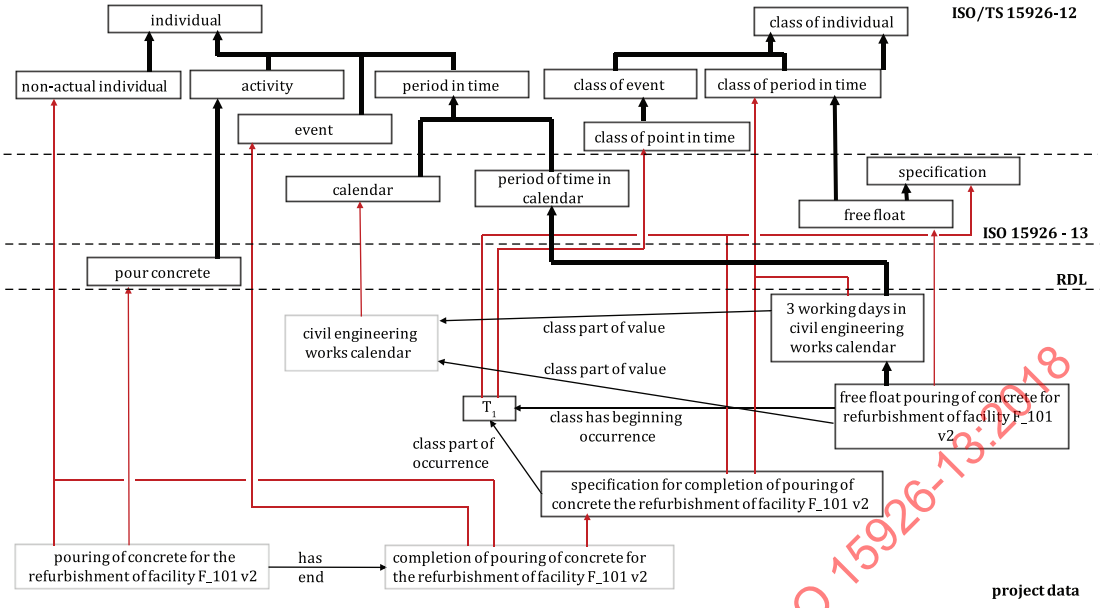

Figure 62 — Free float defined by working days

5.15.5 Dependency relationship

A dependency relationship between **activities** is less precise than a temporal succession relationship.

The statement that activity A is **dependent on** activity B, means that something is created by activity B that is required by activity A.

NOTE An **activity dependent on** relationship is often used where the relationships between **activities** are not within the scope of planning software. Such a relationship may be between an installation activity and a procurement activity.

5.16 Calendar

5.16.1 Working days

A **calendar** is a **period in time** with a pattern corresponding to working days. Within the overall duration of a **calendar**:

— a **period in time** that is part of a **calendar** is working time;

— a **period in time** that is not part of a **calendar** is non-working time.

NOTE 1 A **calendar** is usually specified as a pattern of daily or weekly repeated working times, but with exceptions if necessary.

A **period in time** that is part of a **calendar** is a **period in time in calendar**. A period in time in calendar may be:

— a **period in time within a working day**;

— have a duration recorded as a **number of working days**.

NOTE 2 A **calendar** can be defined by union, intersection, subtraction and complement operations on **periods in time**.

The following may be part of a calendar:

— **activity**: the **activity** takes place only during working time;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

— **resource**: the **resource** is available only during working time;

— **period of time** that is a lag for a succession relationship: only working time is part of the lag;

— **event** that is a milestone: the milestone can be reached only during working time.

EXAMPLE The proposed **activity** 'pouring concrete for refurbishment of facility F_101 version 2' takes place during the **calendar** 'civil engineering works calendar'.

The **calendar** 'civil engineering works calendar' is defined by a subtracting the **period in time** 'public holidays' from the **calendar** and **weekly repeating period in time** 'civil engineering working hours'.

Objects are as follows:

— 'pouring concrete for refurbishment of facility F_101 plan version 2': a **activity**;

— 'civil engineering works calendar': a **calendar**;

— 'civil engineering working hours': a **calendar** and **weekly repeating period in time**;

— 'public holidays': a **period in time**.

These objects, with their classifications and relationships, are shown in Figure 63.

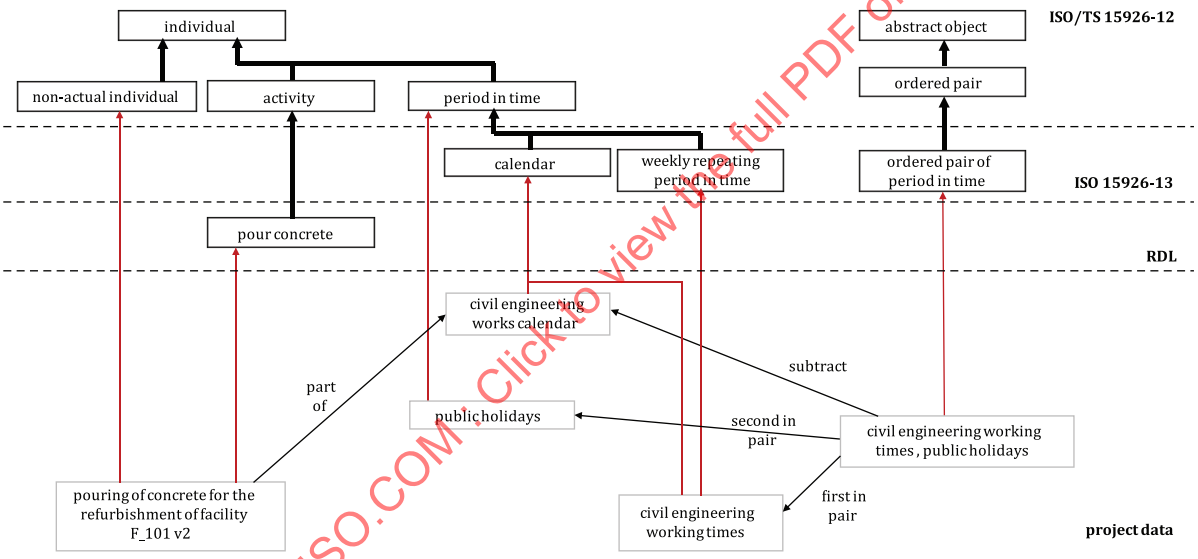

Figure 63 — Calendar for an activity

5.16.2 A repeating period in time

A **repeating period in time** can be a **weekly repeating period in time** (repeating every 7 days) or a **daily repeating period in time** (repeating every 24 hours).

EXAMPLE The weekly **repeating period in time** 'civil engineering working hours' is defined as 8 a.m. to 12 noon and then 1 p.m. to 4.30 p.m. each day except Saturdays and Sundays. This is defined by a **subtract** of the **weekly repeating period in time** 'Saturdays and Sunday' from the **daily repeating period in time** 'daily working hours'.

Objects are as follows:

— 'civil engineering working hours': a **weekly repeating period in time**;

— 'daily working hours': a **daily repeating period in time**;

— 'Saturdays and Sundays': a **weekly repeating period in time**;

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

— ‘Saturdays’: a **weekly repeating period in time**;

— ‘Sundays’: a **weekly repeating period in time**;

— ‘8 a.m. to 12 a.m.’: a **daily repeating period in time**;

— ‘1 p.m. to 4.30 p.m.’: a **daily repeating period in time**;

— ‘8 a.m. to 12 a.m. and 1 p.m. to 4.30 p.m.: a **daily repeating period in time**.

These objects, with their classifications and relationships, are shown in Figure 64 and Figure 65.

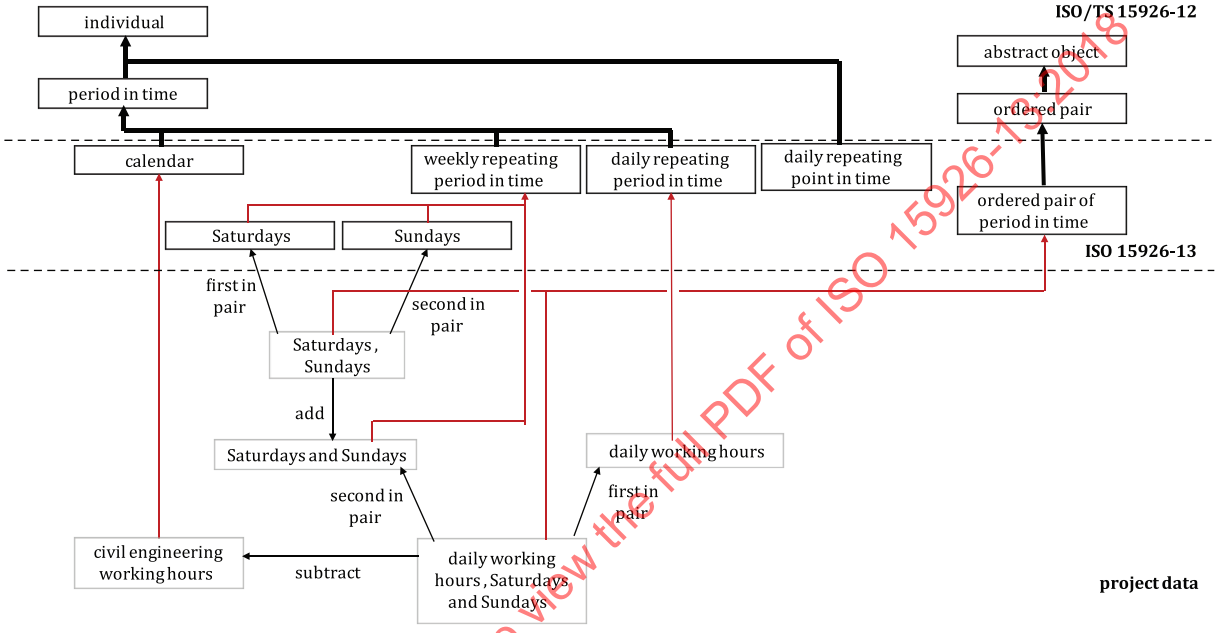

Figure 64 — Weekly repeating period in time

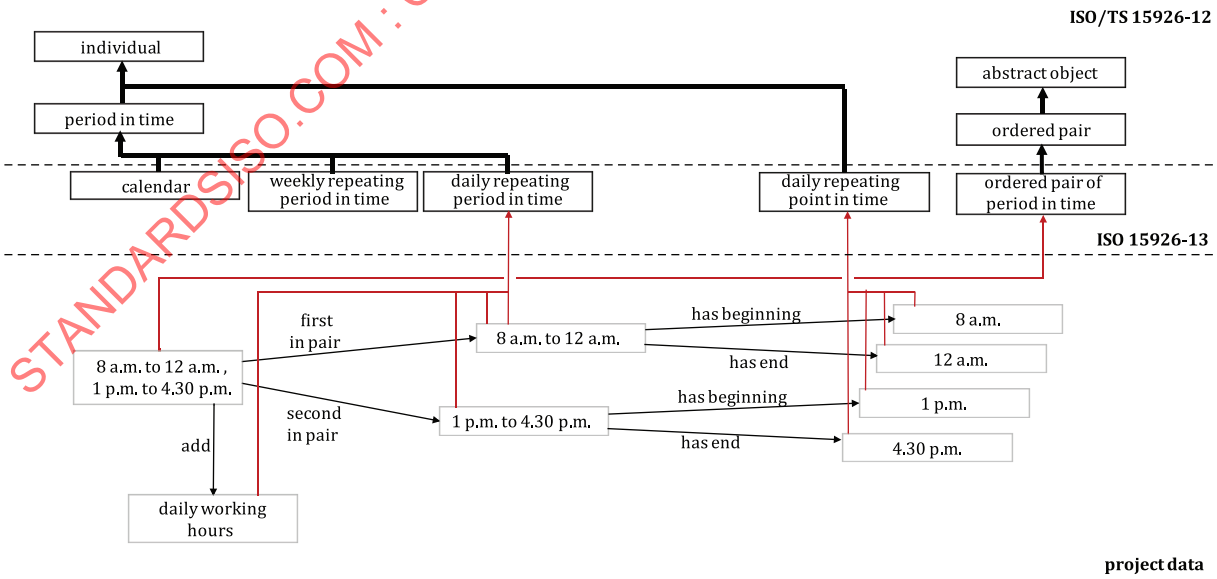

Figure 65 — Daily repeating period in time

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

5.16.3 A repeating point in time

A **repeating point in time** can be can be a **weekly repeating point in time** (repeating every 7 days) or a **daily repeating point in time** (repeating every 24 hours).

EXAMPLE The **point in time** is defined as each Monday at 8 a.m is a **weekly repeating point in time**.

Exemplary objects, with their classifications and relationships, are shown in Figure 66.

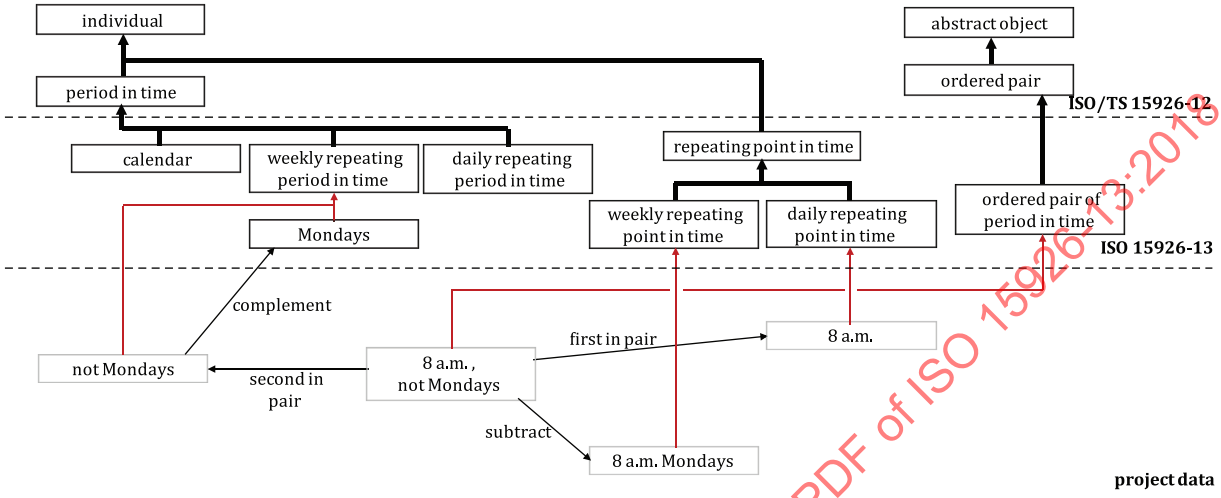

Figure 66 — Weekly repeating point in time

5.17 Identification of objects

Objects may be assigned different identifiers by different **organizations**.

NOTE 1 An **operator** and a **main contractor** can use different identifiers for the same **activity** or **class of resource**.

Objects may also have different identifiers with different roles. Identification roles defined in this document are:

— **code**: a concise identifier that is not intended to be person interpretable;

— **label**: an identifier that is intended to be person interpretable;

— **local system id**: an identifier that is intended for use by a single system and that is unique only within that system;

— **global system id**: an identifier that is intended for use by collaborating systems and that is globally unique.

NOTE 2 A **global system id** can be an IRI.

The **organization** and the **installed software** that assigns an identifier may be recorded, and the time of assignment.

EXAMPLE The organization 'UGE Oil' assigns labels to the activities in the breakdown of 'UGE-1 natural gas capacity upgrade'. The activity 'installation of piping for dehydration train B' is assigned the label 'dehyd B piping". This is shown in Figure 67.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

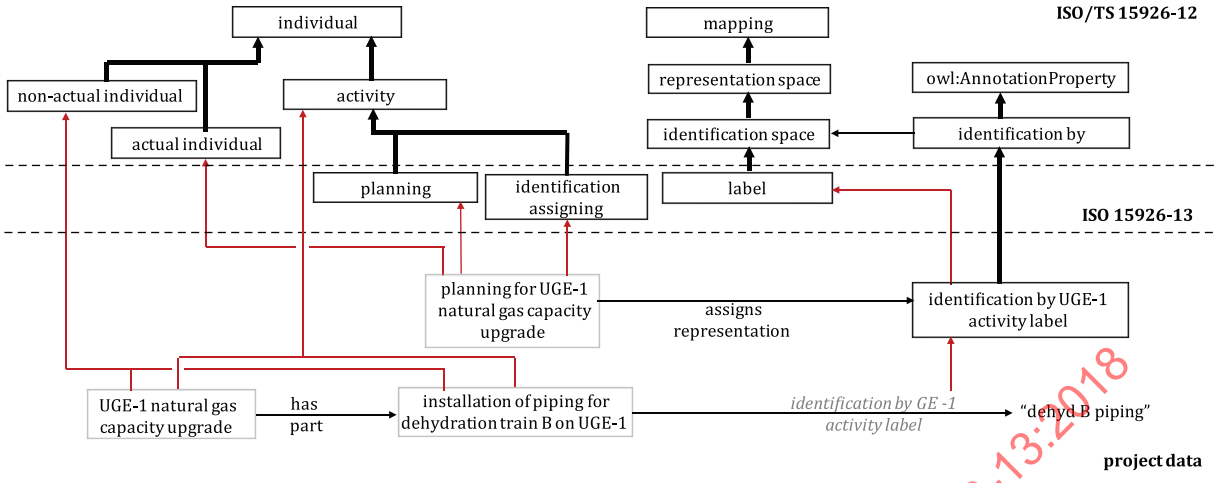

Figure 67 — Assigning identifiers

In Figure 67, the role of the organization UGE-1 as **performer** of the activity 'planning for UGE-1 natural gas capacity upgrade' is not shown.

5.18 Work order

A **work order** is an **activity** that includes:

— the issuing of a request to an **organization** to perform an **activity**;

— the performance of that **activity**.

The description of a **work order** defines a **specification** of the **activity** to be performed. A **work order** has the actual **activity** that is a **realization of** the **specification** is a part of the **work order**.

5.19 Area of facility and site

An **area of facility** is a **physical object** that is all that is within a **region of space**. The **region of space** that defines an **area of facility** can change over time. An **activity** can take place within an **area of facility**.

NOTE An **area of facility** can be an FPSO module.

A **site** is a **physical object** that is all that is on, above or below a part of the surface of the earth. The part of the surface of the earth that defines a **site** can change over time. A **site** can be on land or sea. An **activity** can take place within a **site**.

A **site** can be classified according to the environment. The following subclasses of **site** are members of **class of site by environment**:

— **green field site**;

— **brown field site**.

6 Scheduling application view

6.1 Use of the scheduling application view model

This clause describes the scheduling application view model and its relationship to the planning ontology. The scheduling application view model is represented as UML diagrams and as an ontology represented in OWL.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

The classes in the view ontology are formally subclasses of classes in the planning ontology, but they are created in order to specify constraints on the data that can be recorded using the view.

The properties in the view model are templates which hide objects in the ISO 15926 planning ontology. A statement made using the properties in the view model can be "lifted" to one or more statements using the full ISO 15926 planning ontology.

Lifting may require the creation of the missing objects. The definition of these object may rely upon context information that is not stated explicitly within the view.

6.2 Simplification of the ISO 15926 ontology

For every **activity** there is a network of objects as shown in Figure 68.

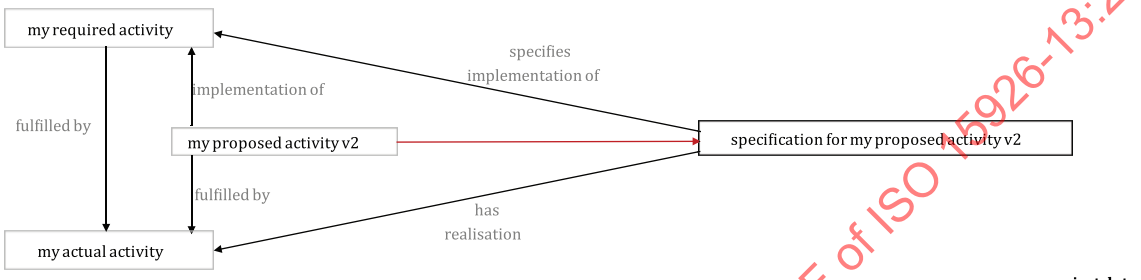

Figure 68 — Objects at a level of decomposition

NOTE 1 A **schedule** is **information content** that contains a **specification**.

An **activity** can be decomposed into parts. There is a parallel decomposition for each of these objects.

In the scheduling application view model:

— only the required **activity** and the **specification** for its implementation are shown;

— the top activity is a **project**, and there is a single level of decomposition where each part is an **activity in project**;

— the whole-part relationships that are relevant to scheduling software are recorded between the **specification** for the **project** and the **specifications** for the **activities in project**.

The relationship between a project and an activity in project is shown in Figure 69.

Figure 69 — Project and activity in project

NOTE 2 An **activity in project** corresponds to the term "activity" in ISO 21500, which is defined as "identified component of work within a schedule that is required to be undertaken to complete a project".

NOTE 3 An **activity in project** corresponds to the element "ProjectScheduleTask" in the UN/CEFACT XML schema (see Annex G), which is defined as "A cohesive activity, collection of activities, or milestone with a definite duration or date which is required to create a deliverable within a project." Within this document, activities and events, which can be milestones within a plan, are distinguished.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

 © ISO 2018 – All rights reserved

6.3 An actual activity in the scheduling application view model

In the scheduling application view model, statements about an actual **project** or **activity in project** are recorded as follows:

— as properties of the required **project** or **activity in project**, where they are independent of **specification**;

NOTE 1 The class project has the property project has actual current expenditure.

— as properties of the **specification** for the **project** or **activity in project**, where they depend upon the **specification**.

NOTE 2 The class specification for activity in project has the property activity frontline date.

The date for which the properties are valid is specified for the **project** or **activity in project** by the properties:

— **project has date of reported data**;

— **activity has date of reported data**.

Properties relevant to the specification at the date of the reported data are recorded for the specification.

NOTE 3 The class **specification for activity in project** has the property **activity has planned current activity expenditure**.

EXAMPLE 1 In the scheduling application view model, the **specification for project** 'UGE-1 natural gas capacity upgrade plan version 2' has the properties **project has date of reported data** with the value '2015-07-11' and **project has actual current percentage complete** with the value '57'.

In the lifting of the data represented in the scheduling application view model to the ISO 15926 planning ontology, **has percentage complete** is the property of the temporal part of the **actual activity** 'actual UGE-1 natural gas capacity upgrade' that ends on 2015-07-11.

The representation using the scheduling application view model and the ISO 15926 planning ontology are shown in Figure 70 and Figure 71.

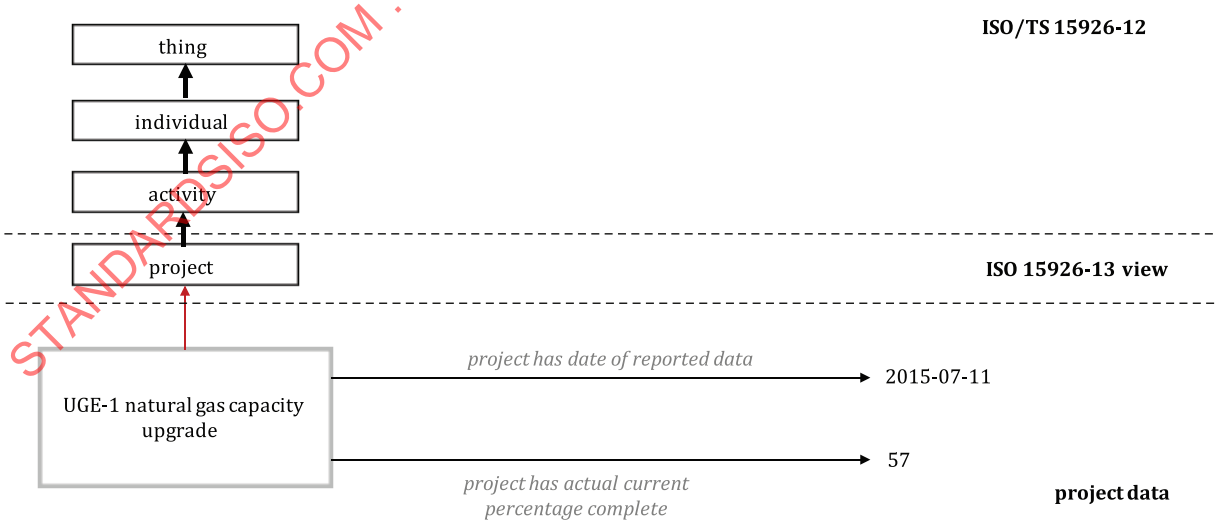

Figure 70 — Percentage complete in the scheduling application view model

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

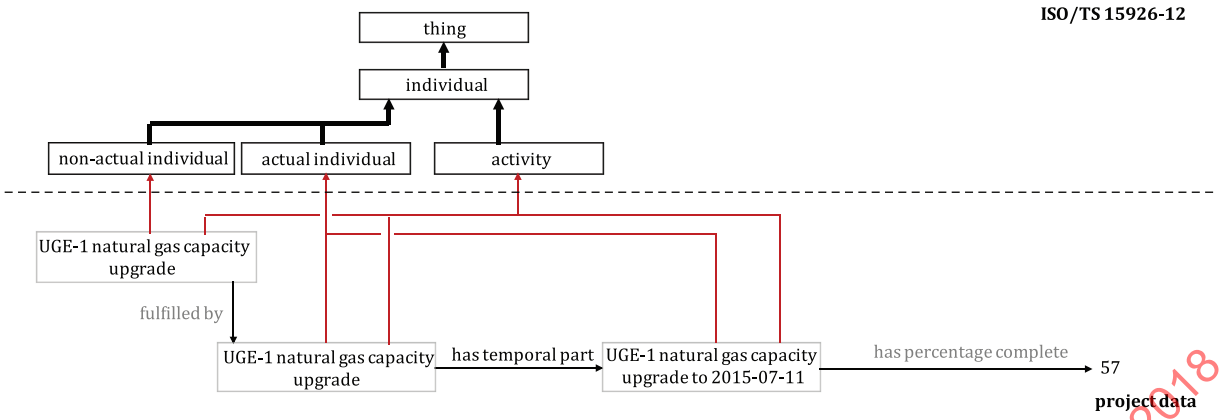

Figure 71 — Percentage complete in the ISO 15926 planning ontology

In an exchange scenario, a sequence of exchange files will have different dates of reported data and different actual percentage complete values for the same **project** or **activity in project**. When "lifted" to the ISO 15926 planning ontology, the dates of reporting data define the ends of different actual temporal parts which have different percentage complete values. A software application could produce a graph of percentage complete against time for the temporal parts. The actual temporal parts may have other properties, such as the expended monetary amount.

EXAMPLE 2 The **specification for activity in project** 'plan to replace the instrumentation of the flare tip of platform UGE-1 version 2' has the risk factor **height work**.

This is represented using the template property **activity has risk factor**. Using the template property, the risk factor for 'replace the instrumentation of the flare tip of platform UGE-1 specification version 3' is represented as shown in Figure 72.

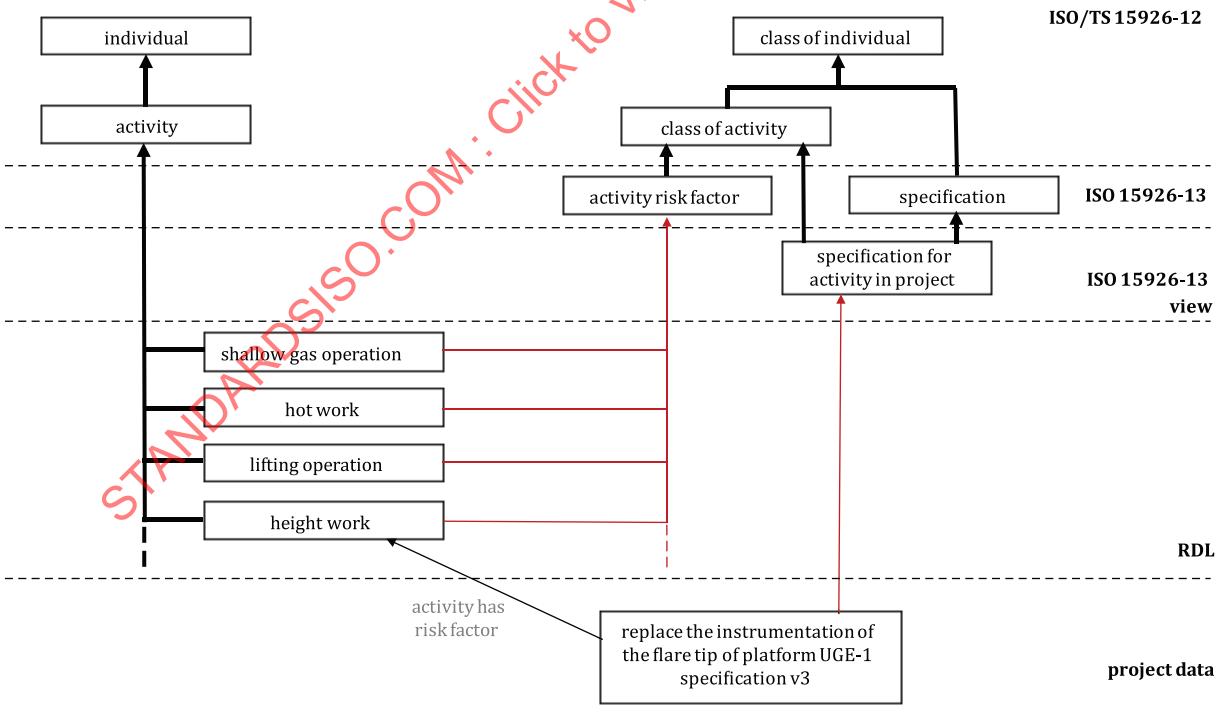

Figure 72 — Risk factor represented using a template property

The template property **activity has risk factor** is a population of **subclass of**. The full ISO 15926 representation of **has risk factor** in Figure 73.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

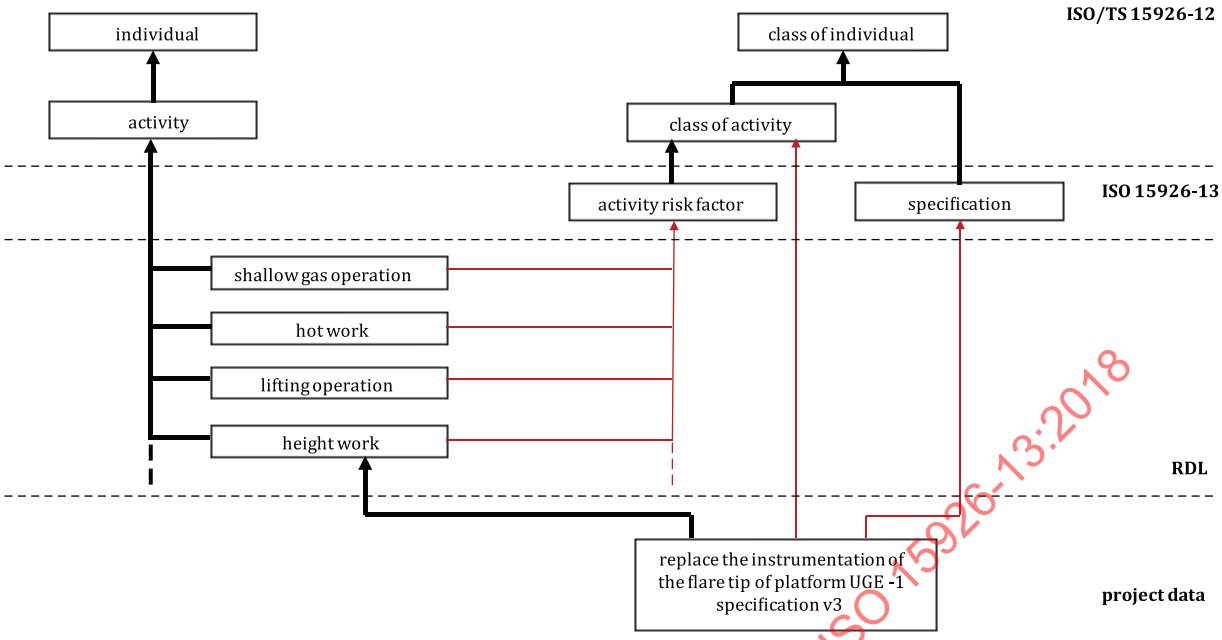

Figure 73 — Full representation of risk factor

6.4 Data planning for the scheduling application view

The organization of the data for the scheduling application interface is shown in the UML diagrams in this clause. The classes in the UML diagrams correspond to classes in the planning ontology. However, not all classes in the planning ontology are used in the scheduling application interface.

The relationships in the UML diagrams correspond to the template properties, which have an expansion into classes in the planning ontology.

NOTE The UML diagrams do not show every aspect of the XML schema that is the scheduling application interface. This is documented in full in Annex C.

The relationships between a project and its schedules are shown in Figure 74.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

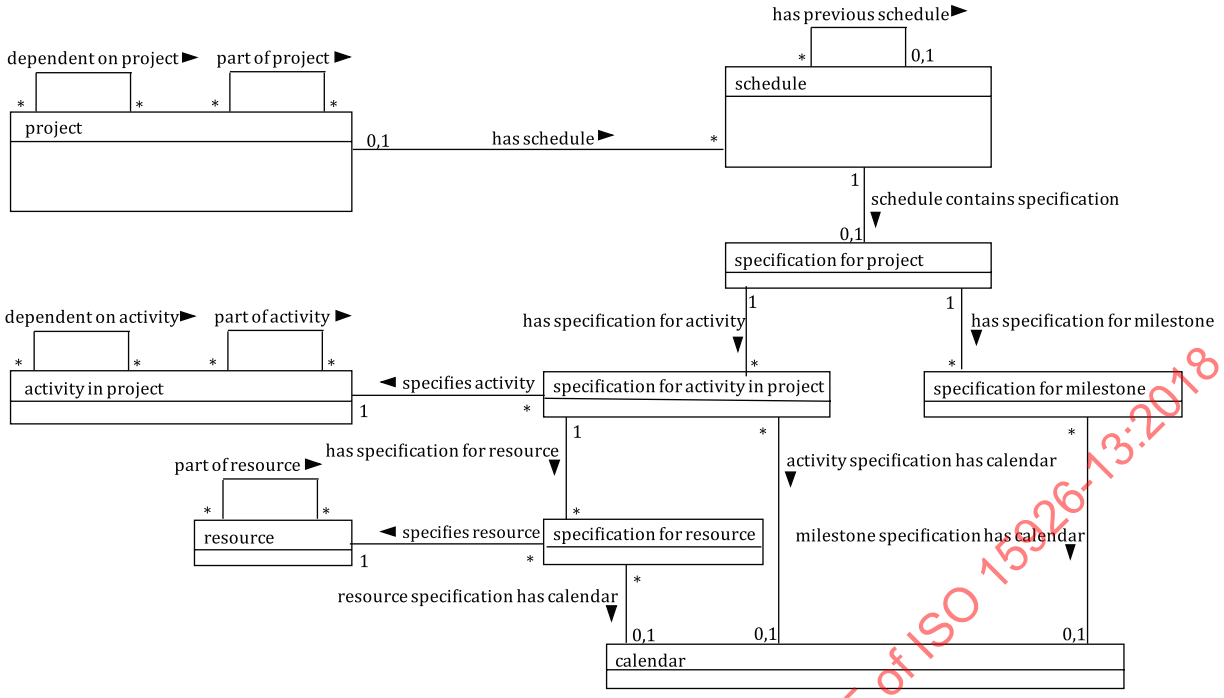

Figure 74 — Data planning for project and schedule

The attributes for a project and schedule are shown in Figure 75. The attributes are colour coded, so that:

— attributes with a medium grey background can change only when there is a new object with a new ID;

— attributes with a dark grey background change with the passage of time and do not require a new object with a new ID.

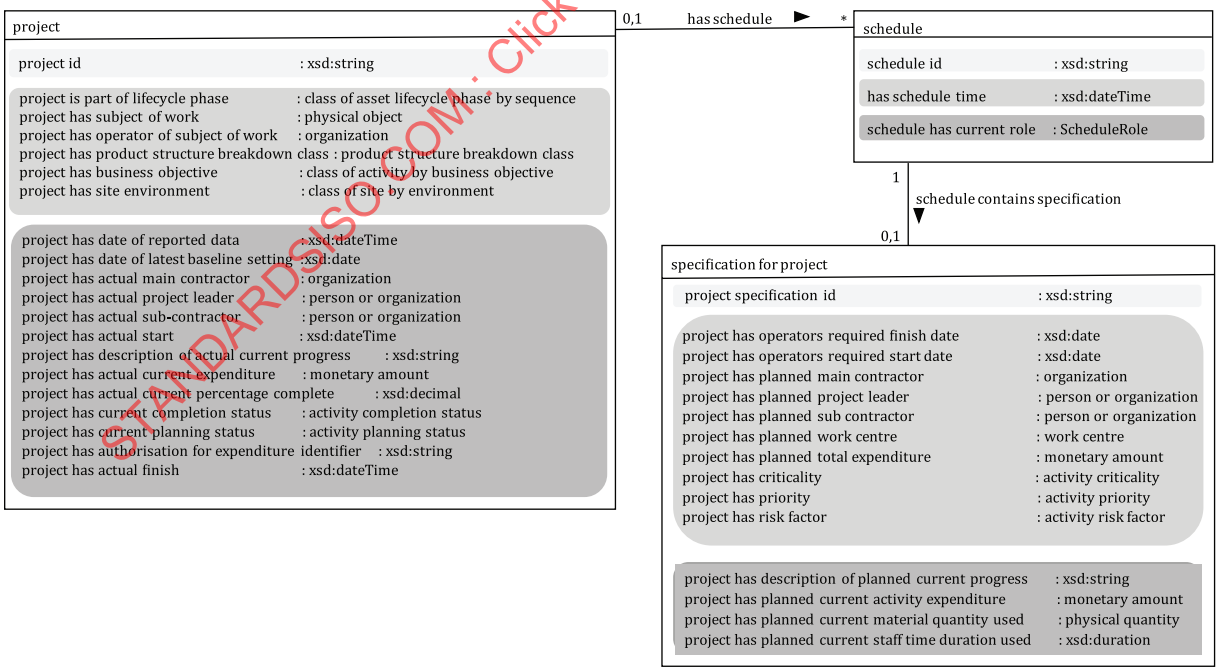

Figure 75 — Data planning attributes for project and schedule

The attributes for an activity are shown in Figure 76.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

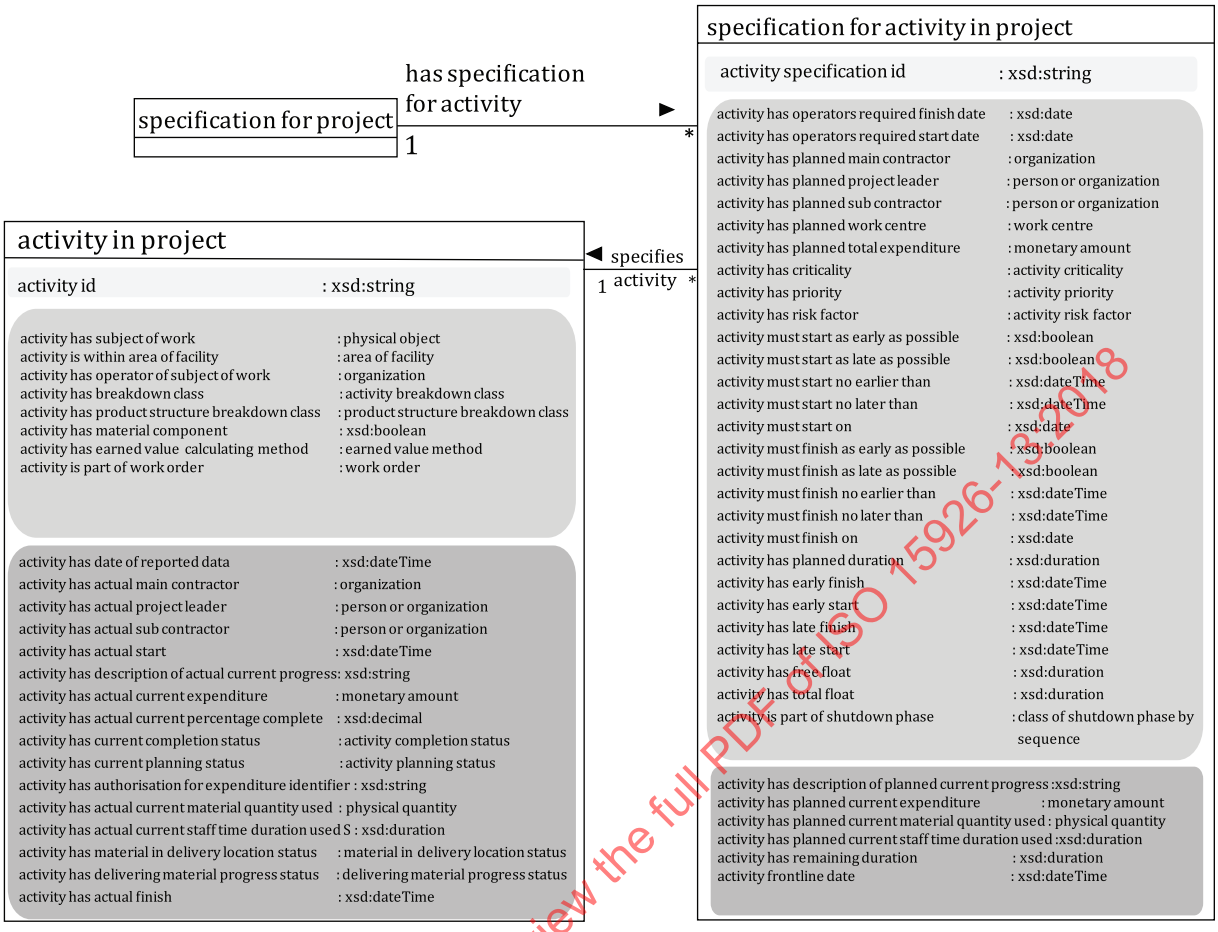

Figure 76 — Data planing attributes for activity

The relationship between and activity and shutdown, and the attributes for shutdown are shown in Figure 77.

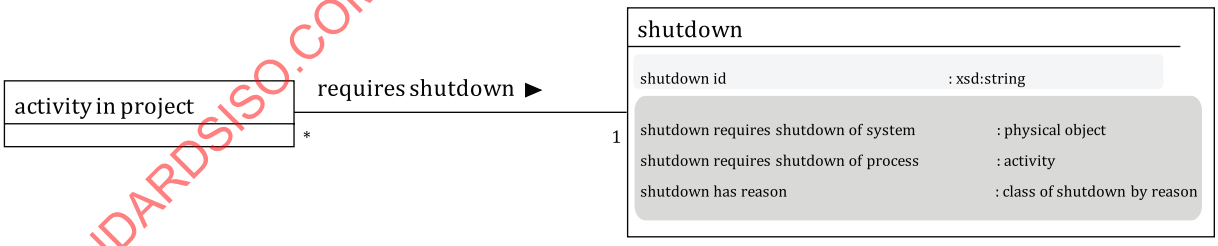

Figure 77 — Data planning for activity and shutdown

The relationships between milestone and specification for milestone, and their attributes, are shown in Figure 78.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

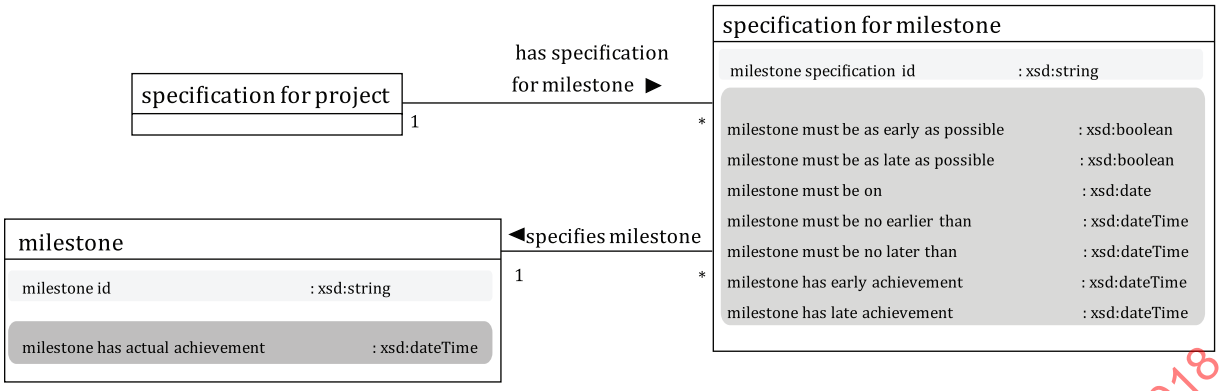

Figure 78 — Data planning for milestone and project

The relationships between resource and specification for resource, and their attributes, are shown in Figure 79.

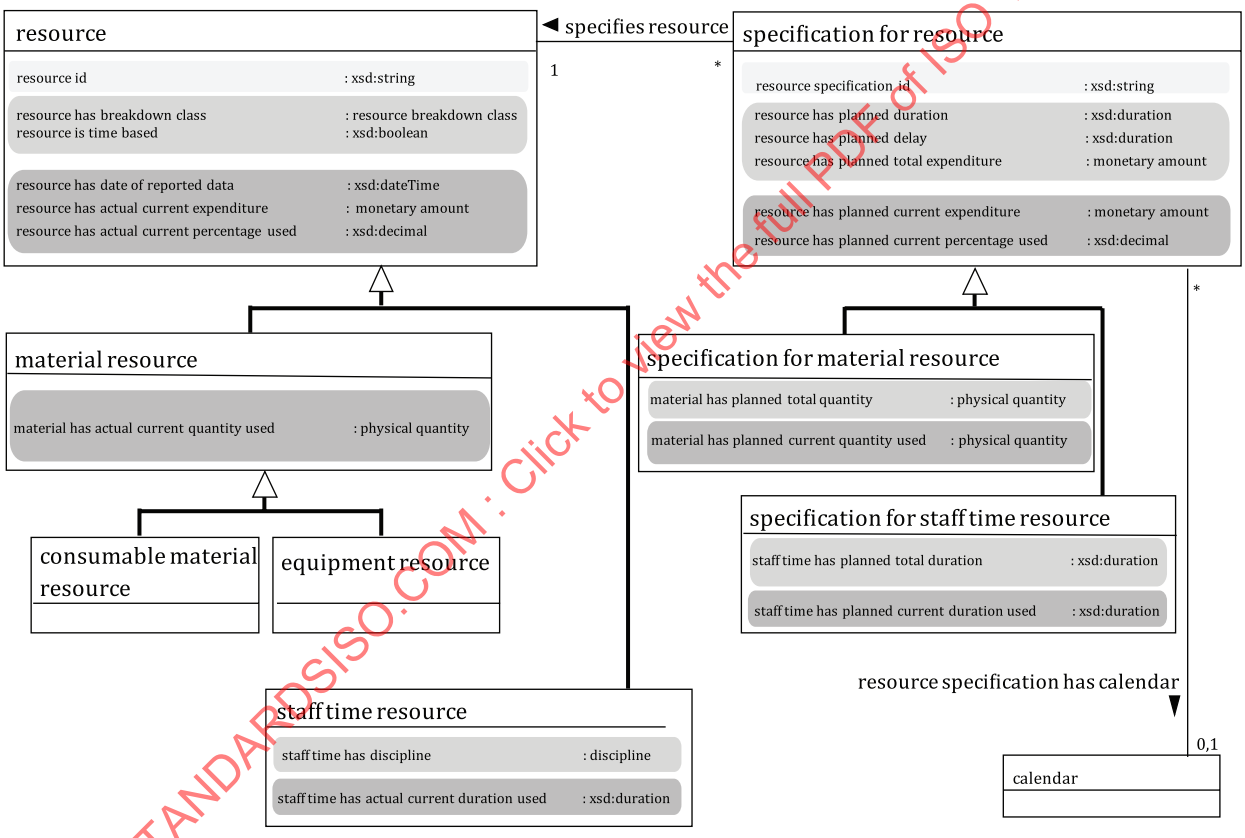

Figure 79 — Data planning for resource and specification for resource

The relationship between a specification for resource, and available resource and its available period is shown in Figure 80.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

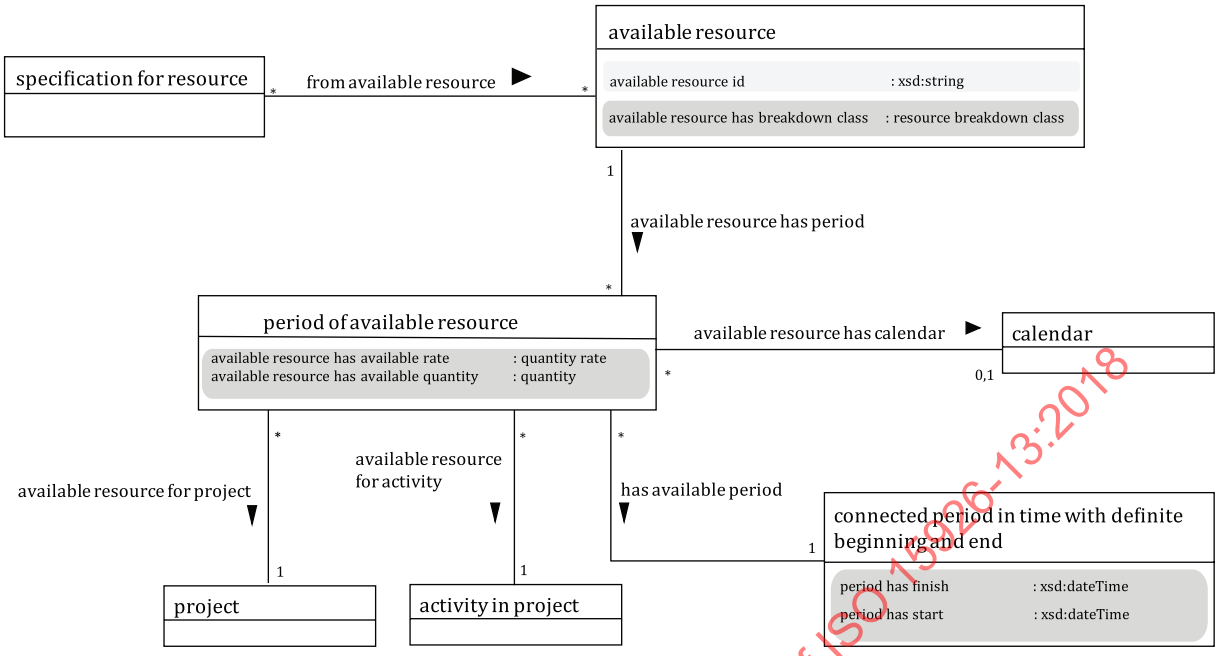

Figure 80 — Data planning for available resource and its available period

The relationships between succession link and specifications for activity and milestone, are shown in Figure 81.

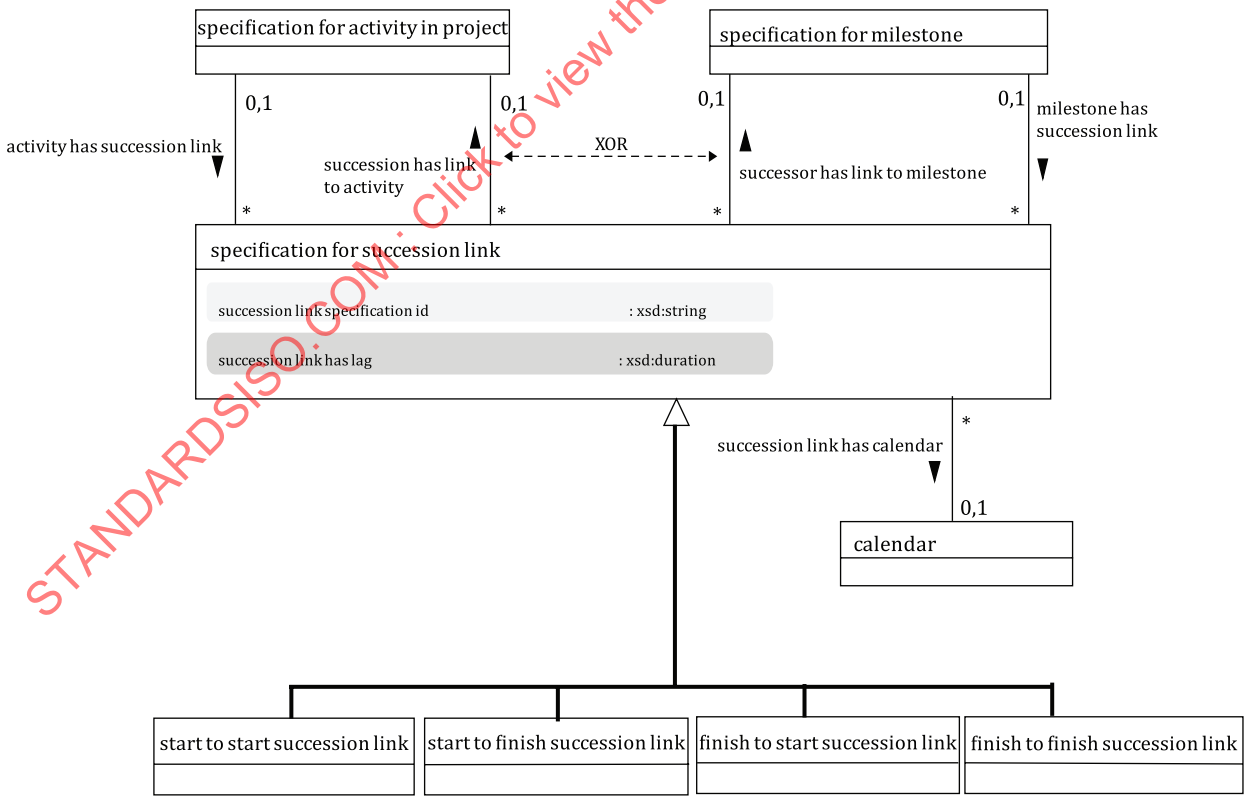

Figure 81 — Data planning for plan succession link

The relationships between calendar, its repeating periods, and calendar operation, and their attributes are shown in Figure 82 and Figure 83.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

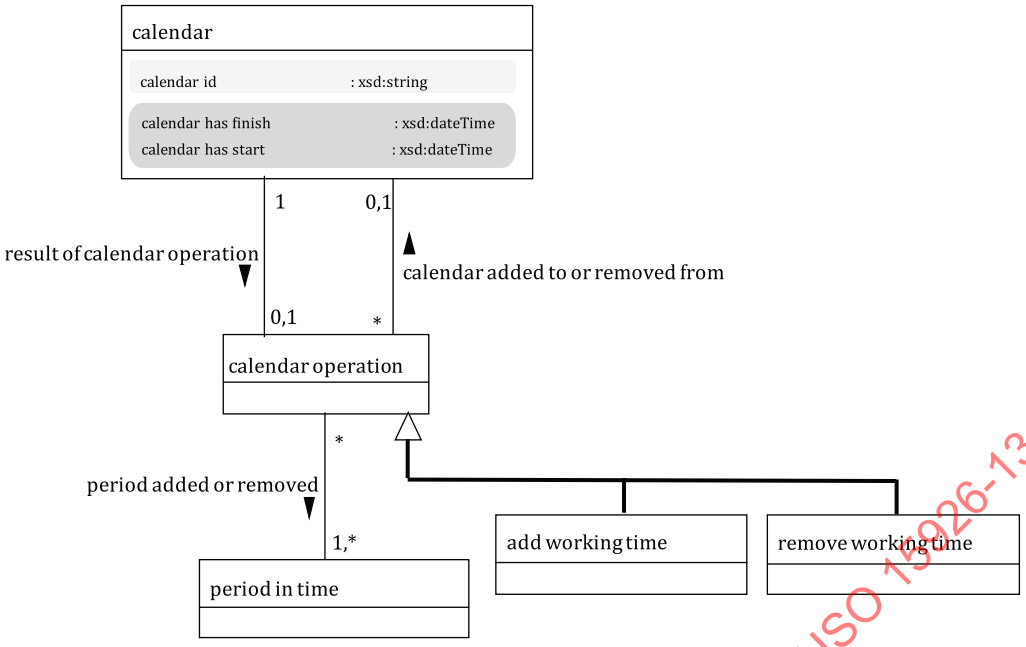

Figure 82 — Data planning for calendar and calendar operation

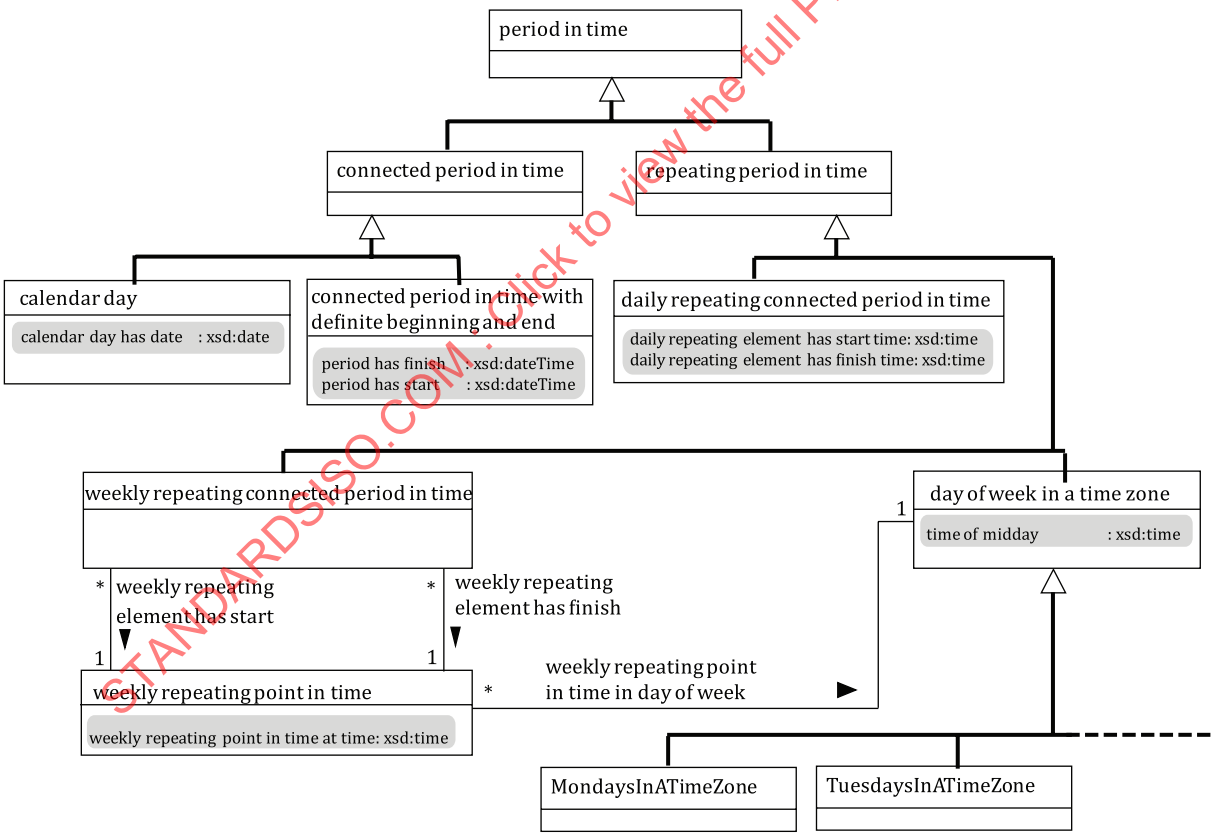

Figure 83 — Data planning for period in time

The representation of a consumption profile as a sequence of profile points is shown in Figure 84.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved

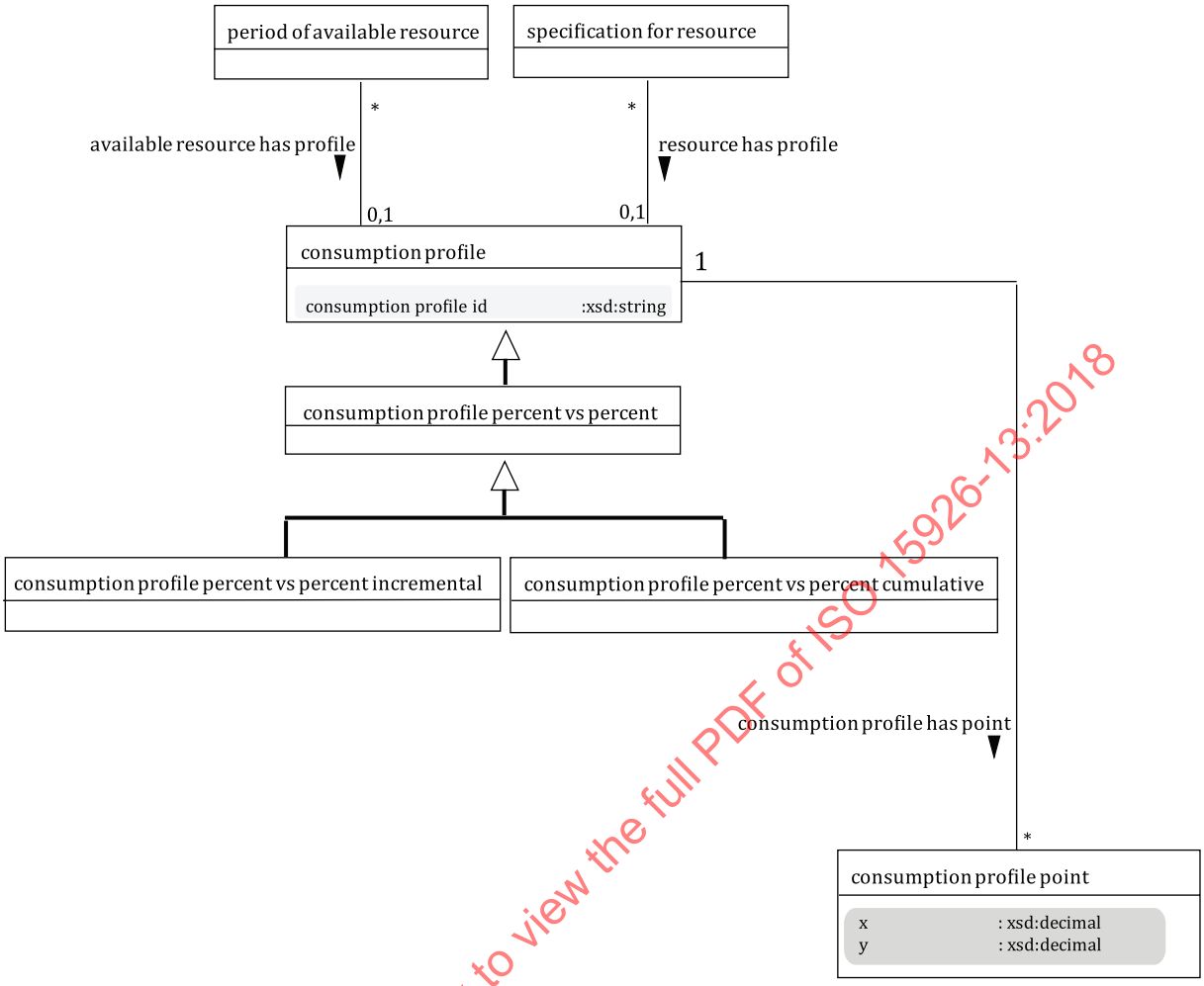

Figure 84 — Data planning for consumption profile

Object identification is shown in Figure 85.

STANDARDSISO.COM : Click to view the full PDF of ISO 15926-13:2018

© ISO 2018 – All rights reserved