CIM Database for Managing Ship Design

CIM Database utilizes document management and project management to ensure traceability, control efforts, and collaboration from initial concepts to detailed ship design.

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energizing great minds

CONTACT Research

Introduction

Summary, challenges and benefit of Change Management

PLM Concepts

An overview of definitions of terms, concepts and architecture

Users

Detailed description of the personas and user roles

Use Cases

Detailed description of the interaction between users and systems

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CADMATIC Wave with Change Management

Introduction

Gaute Gaudestad, Head of PLM at Ulstein:

“We need a well-defined way to handle document revisions and its feedback from externals."

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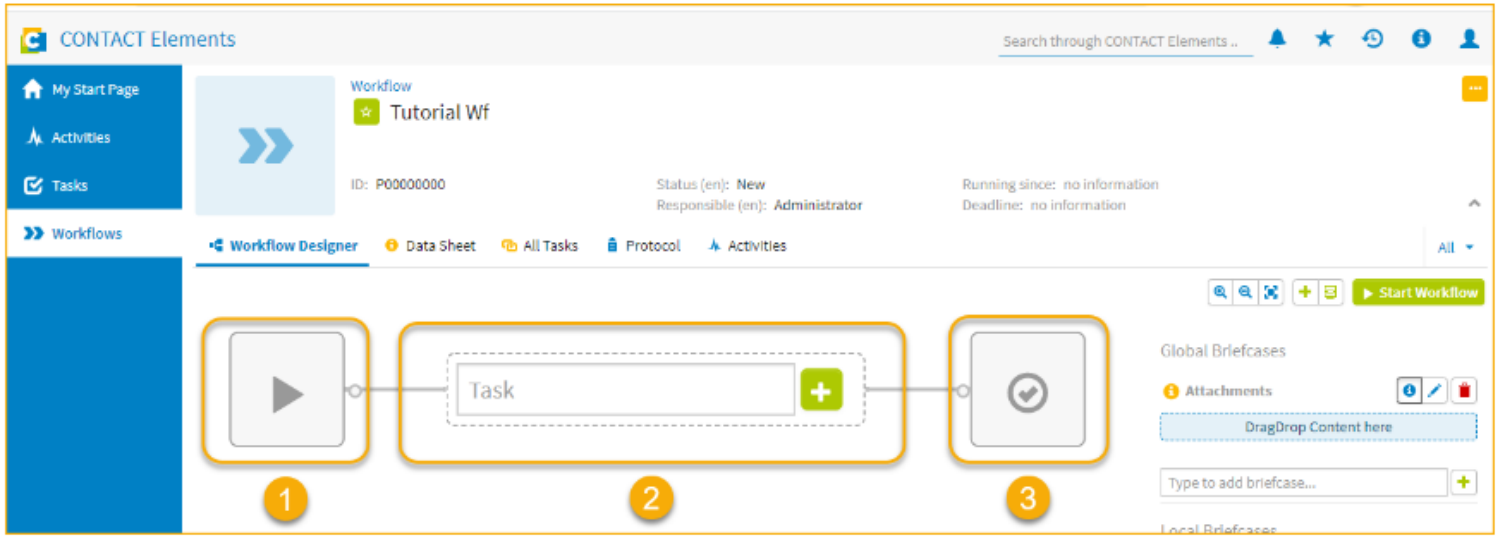
PLM Concepts

Workflow

- Workflows, however, are computer-readable processes that are executable and deterministic, so there is no room for interpretation.



1. The workflow consists of a start node,
2. a placeholder for its first task to be created and
3. an end node.

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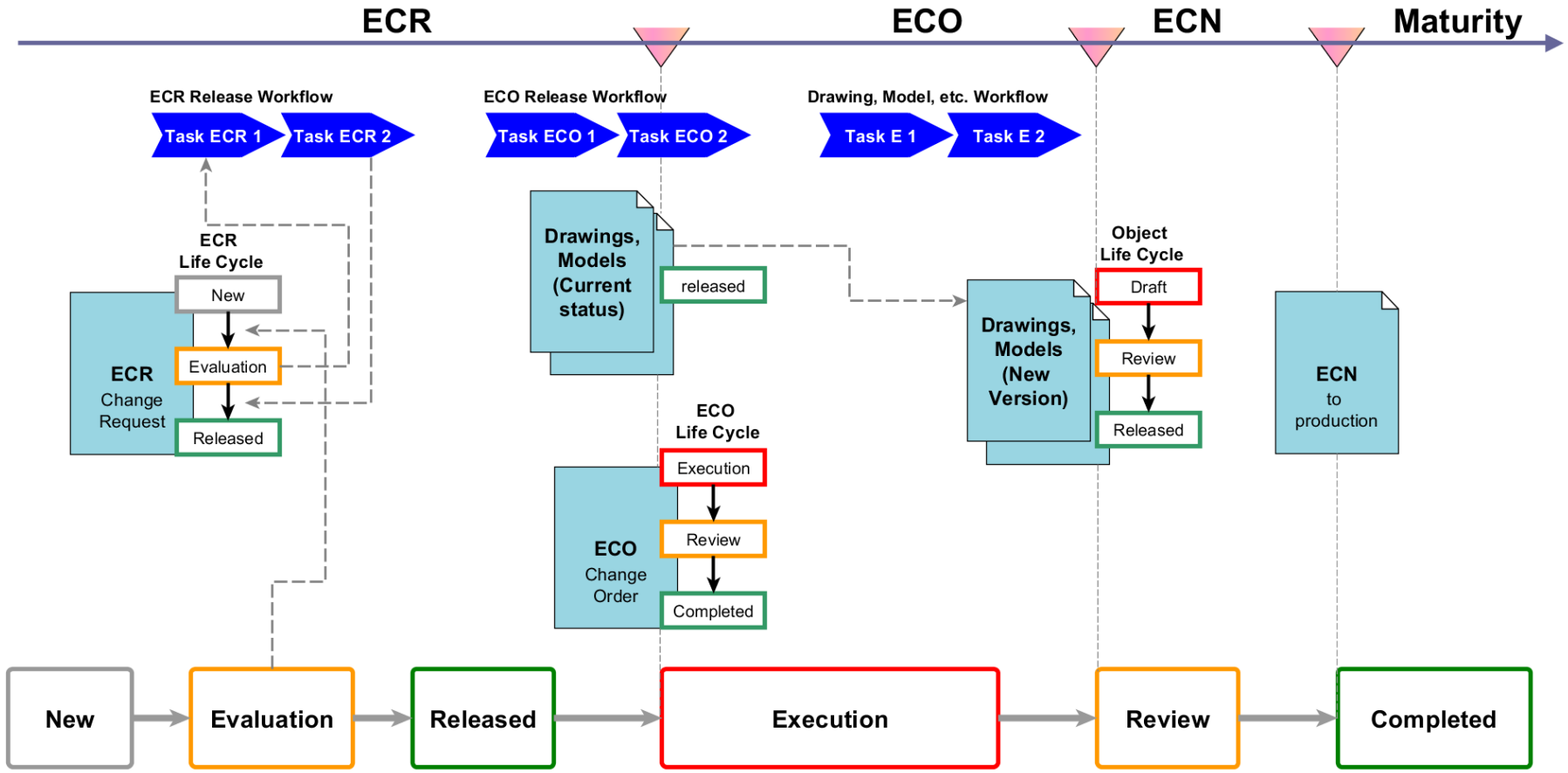
PLM Concepts

Engineering Change



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Users

Detailed description of the personas and user roles

Company	Department	Name	Role in Ulstein	Role in CIM	Note:
	Design		Principal Engineer-Lead Naval Architect	Naval Architect	Project managers
	Design		Principal Engineer-Lead Naval Architect	Naval Architect	
	Design		Principal Engineer-Lead Naval Architect	Naval Architect	
	Design		Senior Principal Engineer - Lead Naval Architect	Naval Architect	
	Design		Principal Engineer - Lead Naval Architect	Naval Architect	
	Design		Manager Design	Naval Architect	
	Design		Engineer - System Architect, Electro	Design Engineer	Engineers
	Design		Senior Engineer Hydrodynamics	Design Engineer	
	Design		Senior Engineer - System Architect	Design Engineer	
	Design		Senior Engineer - Stability & Weight	Design Engineer	
	Design		Principal Engineer - Head of Stability & Weight	Design Engineer	
	Design		Principal Engineer - System Architecht	Design Engineer	
	Design		Principal Engineer - Machinery Systems	Design Engineer	
	Design		Senior Engineer - Head of Hydrodynamics	Design Engineer	
	Design		Senior Principal Engineer - Stability & Weight	Design Engineer	
	Design		Senior Principal Engineer - Head of Electrical Systems	Design Engineer	
	Sales and Marketing		Sales manager	Sales	View'er only
	Sales and Marketing		Commercial Director	Sales	
	Sales and Marketing		Sales Manager	Sales	

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Paul Murmann (42)

Project Manager

“I’m the connecting point between the management and project members. The system is supposed to support me in planning, executing and monitoring projects efficiently and furthermore in communicating with stakeholders.

Required Input

- Person data
- Open issues

Deliverables

- Projects & Project Dashboards
- Project structure plan
- Tasks
- Valuation of open issues
- Schedules
- Reports
- Documents

Tasks

Paul is the project manager and is therefore responsible for the planning, implementation and monitoring as well as the completion of projects. During the supervision of the projects, he adheres to process specifications of the company, that puts great emphasis on transparent and sustainable handling of the project.
He works together with various people and groups of people in the projects: from product management and design to manufacturing, procurement and accounting, he continues to be in constant exchange with external stakeholders. He has to send regular reports to the management team in order to document the progress of the projects. Paul must also maintain an overview of deadlines, costs, tasks, associated documents and project progress at all times.

Use of CONTACT Elements

- Works multidisciplinary in the project management application and via task boards with his team
- Uses project tasks for task description and is responsible for the project structure plan
- Evaluates open issues created by project members to record problems and questions
- Keeps his projects up to date, especially the Project Dashboard
- Uses schedules to plan his projects
- Takes advantage of the card view in project result lists for a quick overview of his projects
- Makes use of document management, e.g., to file and distribute relevant documents
- Uses the Activity Stream to communicate with colleagues and other departments

Thilo Preuss (29)

Technical Product Manager

“ If anyone has any questions about my products, I am the first person to ask.

Tasks

Thilo is a technical product manager and thus responsible for specific products or product lines. He is in close contact with the strategic product management, but in contrast to the strategic product management he rather carries out operational tasks.
Thilo defines and prioritizes the technical requirements of a product. He ensures that these are understood and implemented accordingly by the development department. He regularly tests if products meet the technical requirements and fulfill the requirements of the market.
He plans projects involving his products and sets milestones. In addition, he supports the technical sales department, e.g., he creates sales presentations and holds them at the customer's site or provides support for projects with special requirements. If product-specific documents such as technical articles, manuals or complex data sheets have to be created, he is the right contact person.

Required Input

- Strategic product approach (specifications, variants, ...)

Deliverables

- Product specific documents
- Technical requirements
- Test/Simulation

Use of CONTACT Elements

- Is involved in the creation of product-specific documents (e.g., technical articles, manuals) and stores these as documents for the product
- Defines and prioritizes technical requirements from requirements of the strategic product management in the specification editor
- Sets milestones in projects involving his product
- Works with his team in the project application
- Uses the Activity Stream to communicate with colleagues and other departments

Conrad Molski (57)

Compliance Manager

“To ensure that our products meet all regulatory requirements, I have to combine a wide variety of information from different sources – Quite a tricky task!

Tasks

As a compliance manager, Conrad ensures that the company complies with legal and regulatory requirements in the sector. For this, he must not only know the manufacturing BOMs for all products, but also have information on suppliers and on all current standards and guidelines. Using the parts classification, supplier information and other information from the ERP system, he brings together all the necessary information on a product in order to evaluate it. In addition, he must always keep an eye on changing legal regulations and consider the consequences for the products. Furthermore, he prepares all the necessary proof required for the approval of products in the various target markets.

Required Input

- BOMs
- Part classification
- Proof from third parties in the form of documents
- Standards and guidelines
- Specifications

Deliverables

- Product evaluation
- Proofs / Reports
- Proof from third parties in the form of documents

Use of CONTACT Elements

- Views specifications and BOMs of all products
- Maintains and edits classification features that map information on legal requirements
- Requests up-to-date proof and information on products from suppliers, which may be stored in the PLM system
- Evaluates BOMs according to different legal requirements and target markets, for example with the help of the Material Compliance Solution
- Issues documents that serve as proof of regulatory requirements

Elias Cremer (38)

Engineering Change Manager

“I organize and manage changes to our products. It’s important to collect all parts, documents, etc. that are affected by changes. And this may be quite a few - the system should support me in the best possible way.

Required input

- Semantic links
- Documents to be changed
- Parts to be changed
- Objects to be changed
- Person data

Deliverables

- Engineering change
- Workflows

Tasks

Elias gets notified about change requests by tickets or problem reports. Change reasons can be, e.g., problems and requirements from maintenance or production, new laws and norms or cost aspects. He reviews the request and discusses it in regular change meetings with the affected departments (including development, costing, purchasing). If the request is valid, Elias creates an engineering change request. Therefore, he describes the actual change request, assigns affected parts and documents and adds the responsible departments to it. To find parts and documents in the system, he uses, among other things, the link graph. Depending on the maturity of the product in the development process and the complexity of the change, he assigns workflows of varying complexity. He supervises and coordinates engineering changes up to the engineering change notification phase in which all stakeholders are informed about the changes.

Use of CONTACT Elements

- Creates engineering change requests
- Supervises all phases of an engineering change (ECR, ECO, ECN)
- Uses the link graph to find all changes of affected objects
- Creates workflow templates for engineering changes
- In the project management application, he works together with project teams that are responsible for changes.
- Uses the Activity Stream to communicate with colleagues and other departments

Use Cases

Detailed description of the interaction between users and systems

- **Project Setup**
- **Concept Design**

  The design department collects Documents, Drawings, Files and Mails. Documents need to be reviewed by internal and external Stakeholders. Updated Documents design data will be hosted in PLM system
- **Initial Design**

  The design department shall be able to amend Design Concept with documents and files regarding vessels general design, etc. Updated design data will be hosted in PLM system

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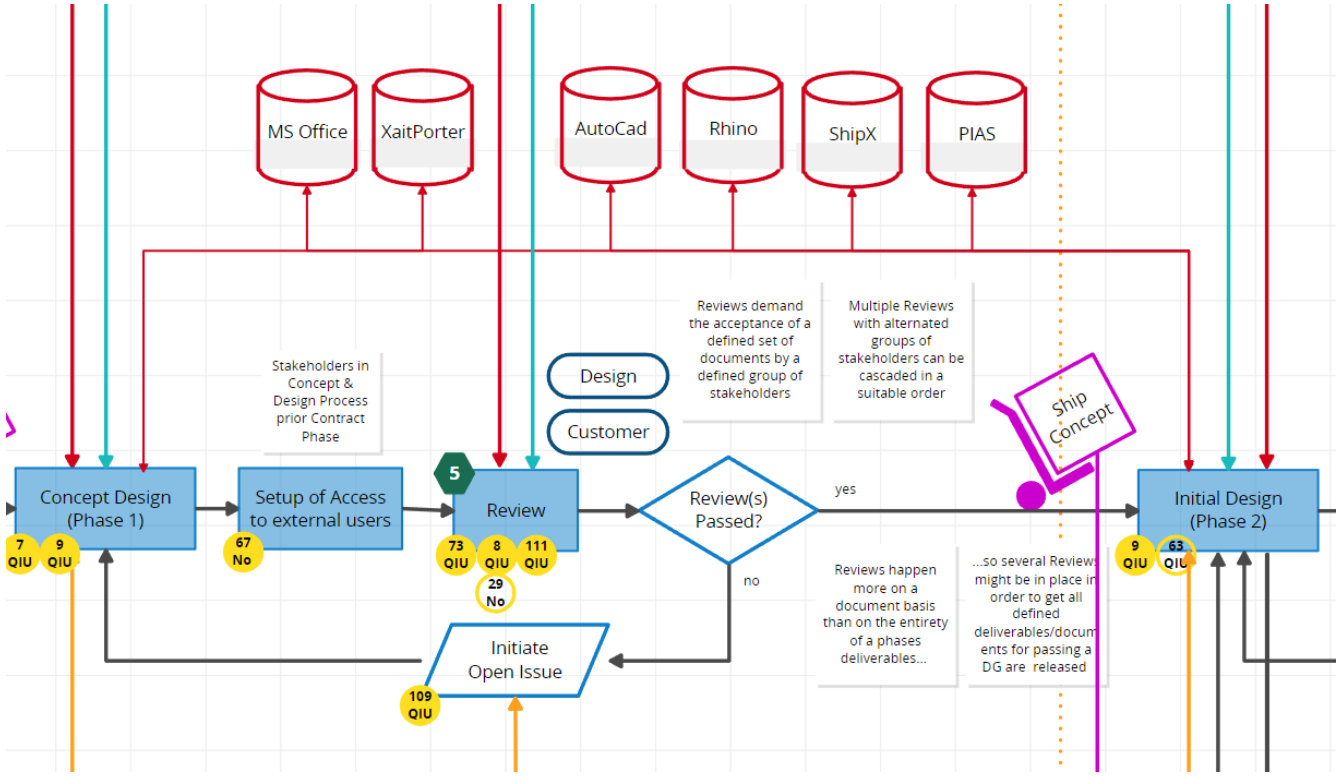
Initial Concept Design & Review

Initiate an Engineering Change by an internal Task



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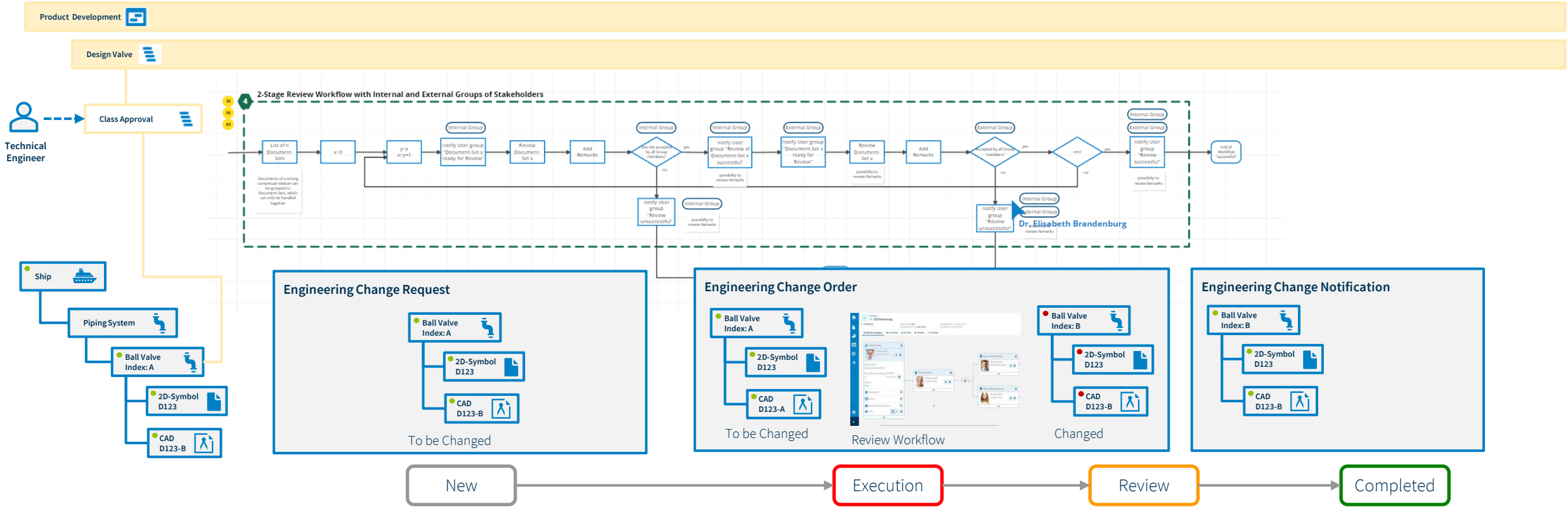
Change Management

Initiate an Engineering Change by an internal Task



Tasks planned by Project Manager initiate an internal change on the product

Create ECR to evaluate one or more Issues reported by Externals and collect product context on a specific part or document revision

Work on that requested Engenineering Change. Create new Index of the changed Documents. When finishing work change status to Review which automatically start the Review workflow.

Notification about changes

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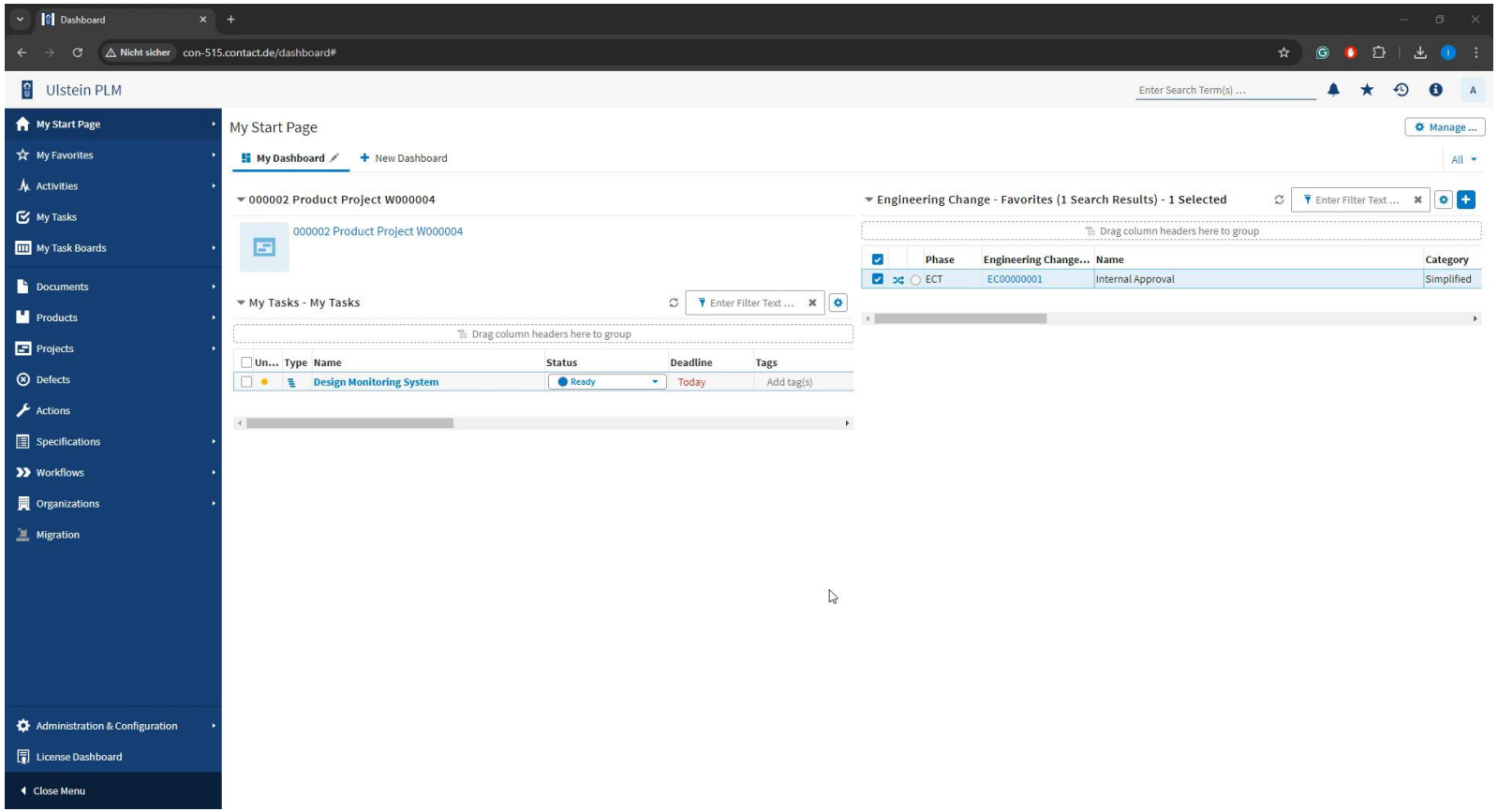
Change Management

Initiate an Engineering Change Request by an internal Task



1. Start from Start Page where current Tasks are listed
2. Begin work by changing status of my assigned task
3. Start Engineering Change from Template
4. Collect relevant Documents for Engineering Change
5. Make status change to execute on the Engineering Change

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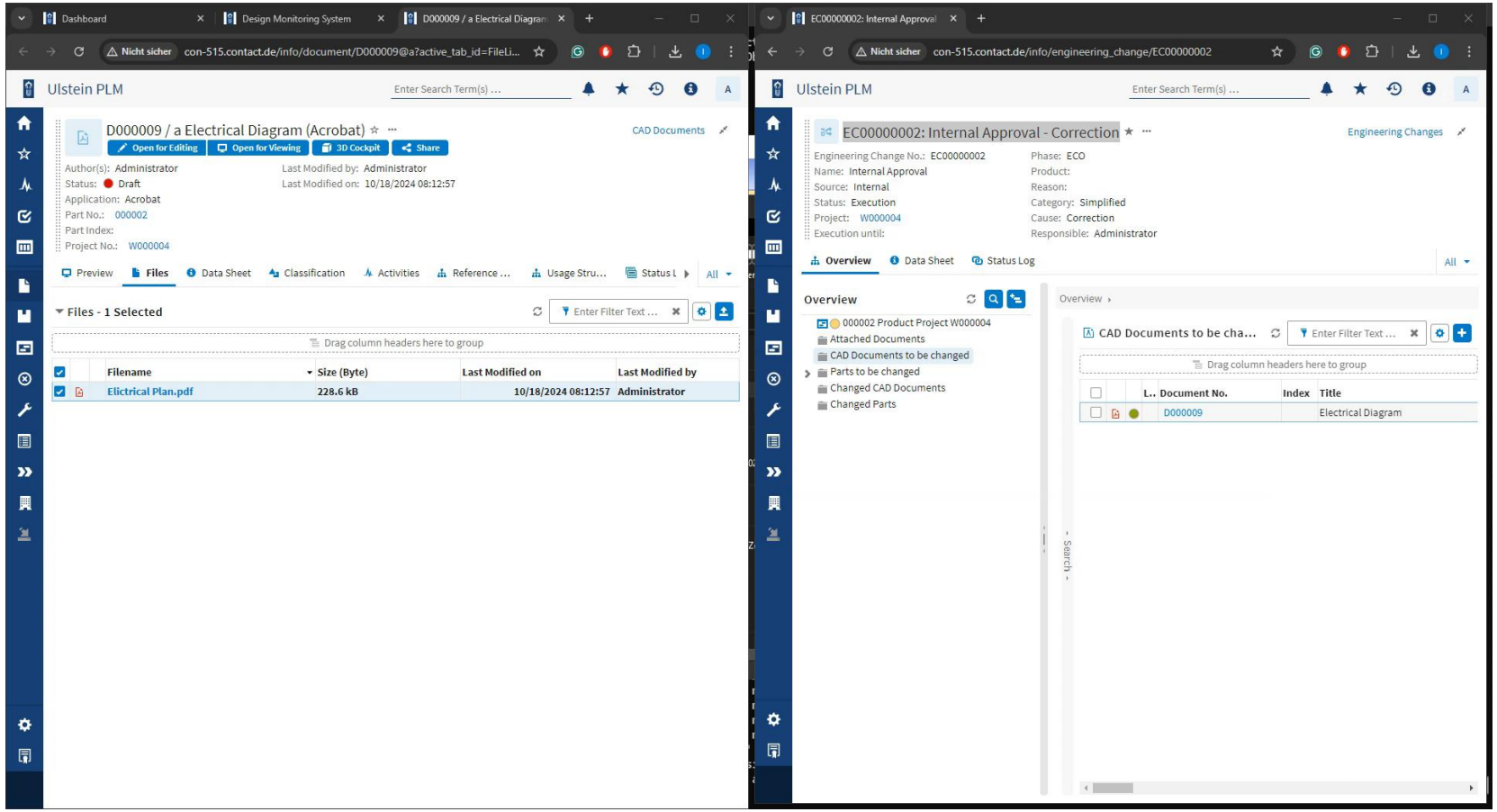
Change Management

Execute and Approve the Engineering Change



1. Change the new Revison of the CAD-Document by creating a new File
2. Do a status change on the engineering change to “Execute” to start the review process
3. Get a notification about an Approval Task
4. Have all information in place for approve the engineering change.
5. Review work by having all information in place

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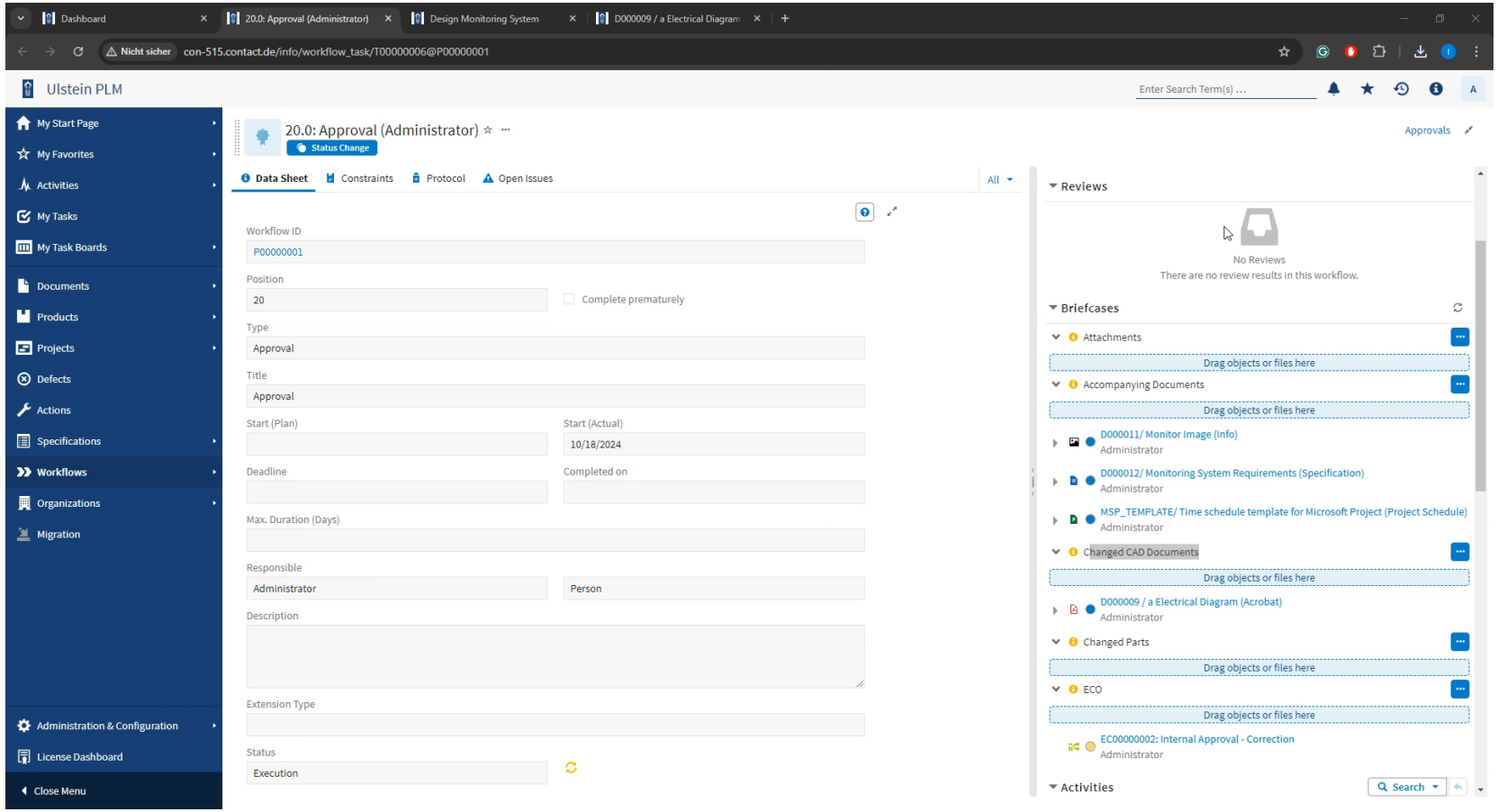
Change Management

Approve the Engineering Change



1. Approve work by the status change of the Approval Task and
2. Add a Comment to document Approval

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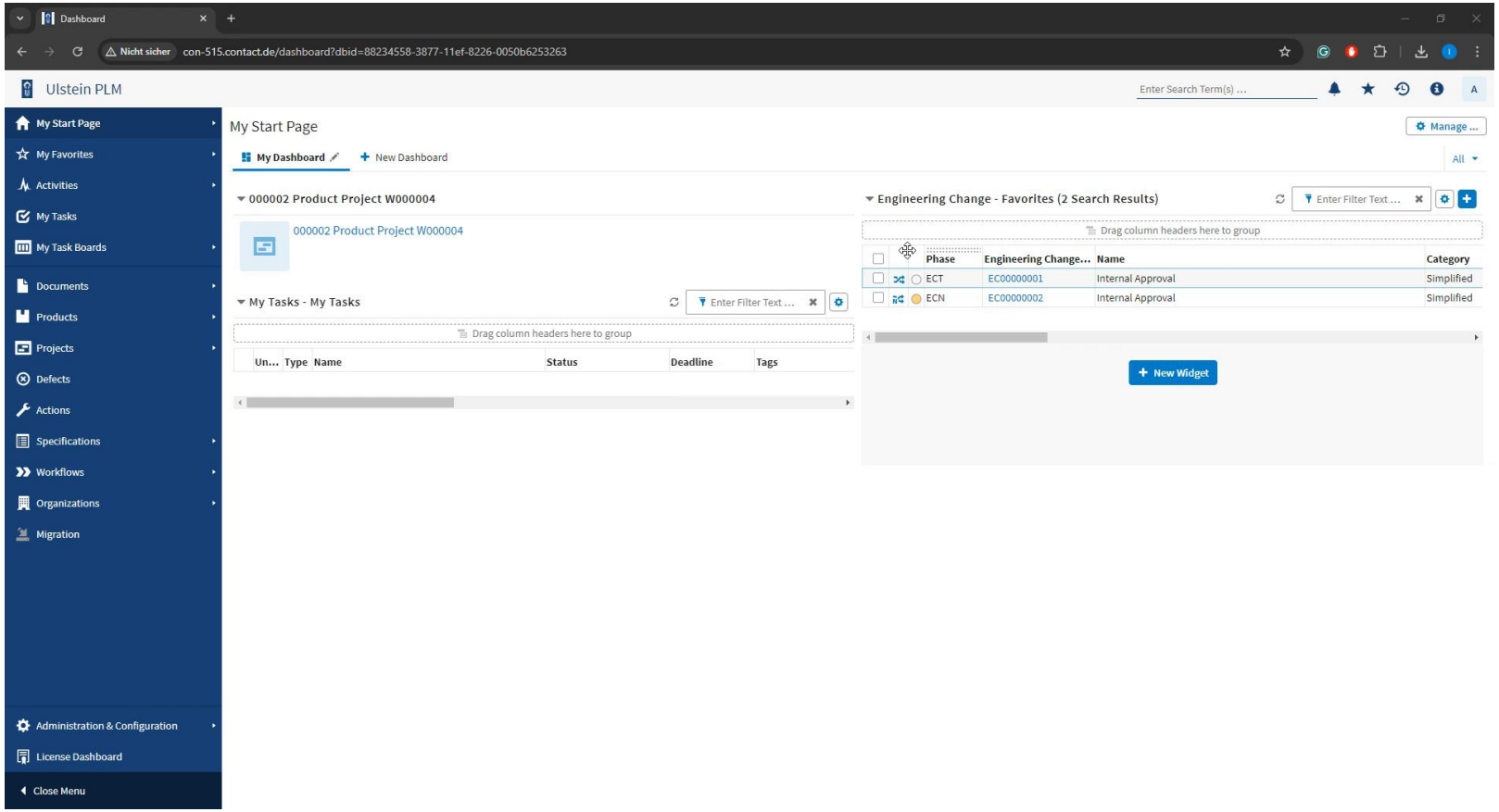
Change Management

Change History



1. Starting from Landing Page to navigate to the Product Project

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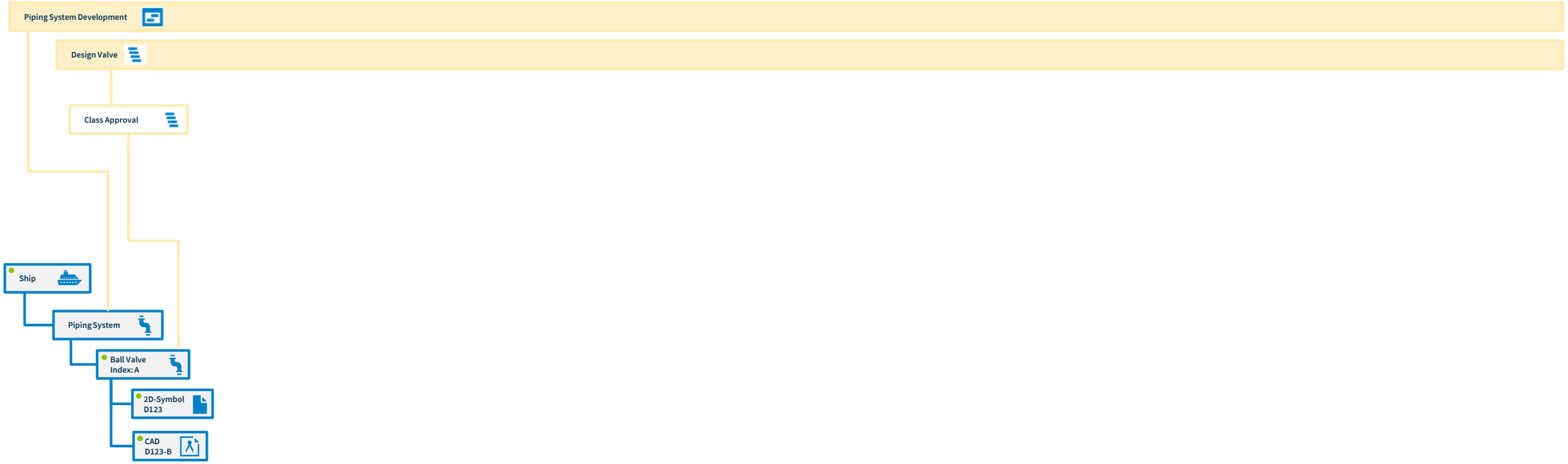
Change Management

Initiate an Engineering Change by an internal Task



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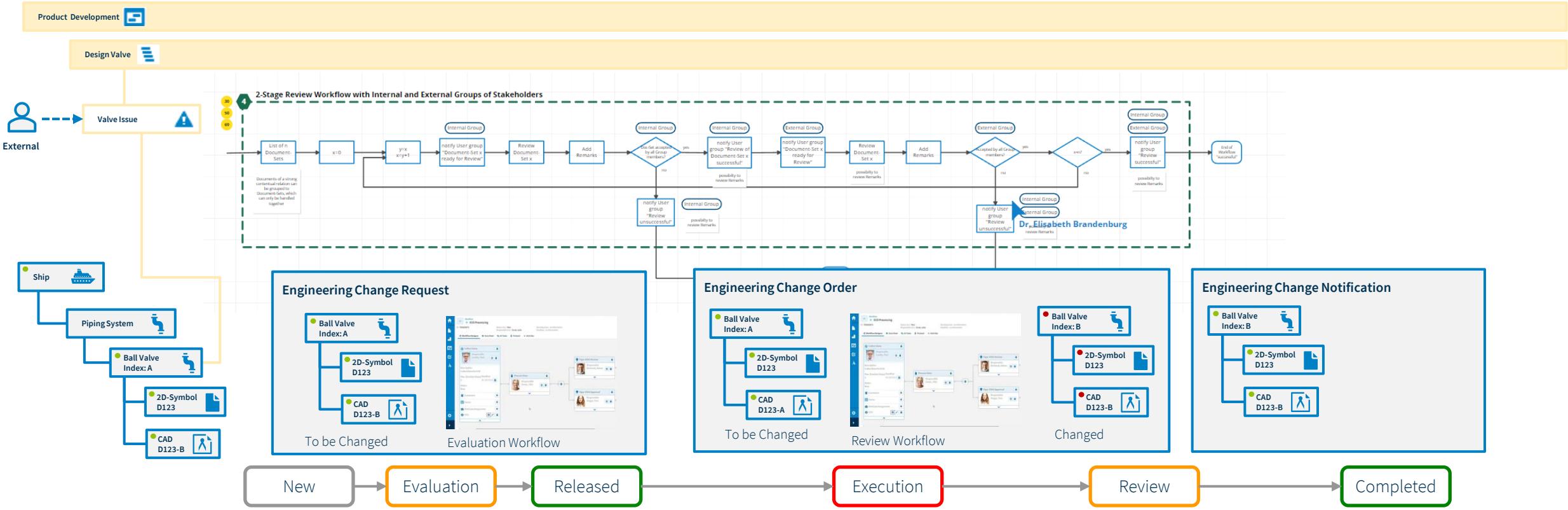
Change Management

Initiate an Engineering Change by an (external) Open Issue



Issues reported by Externals and initiate an internal change on the product

Create ECR to evaluate one or more Issues reported by Externals and collect product context on a specific part or document revision

Work on that requested Engenineering Change. Create new Index of the changed Documents. When finishing work change status to Review which automatically start the Review workflow.

Notification about changes

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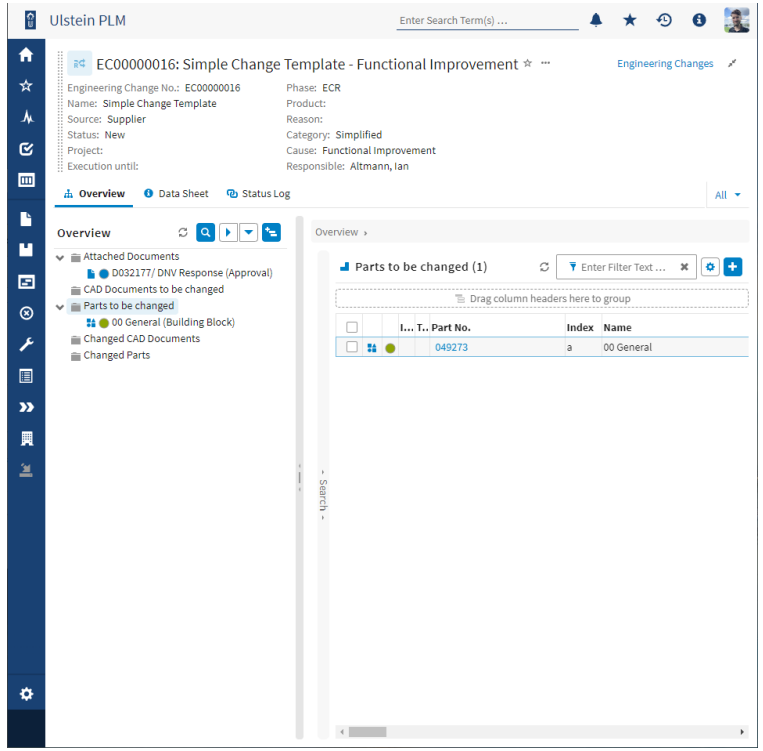
Engineering Change

ECR phase

1. The engineering change is created in the ECR phase from a template (see Work with engineering changes).
2. The work objects (approved models, drawings and accompanying documents) are linked to the engineering change (for example, as a drag-and-drop assignment, see Adding accompanying documents, CAD documents and parts). The engineering change is changed to the Execution status via a status change.



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Comments & Issues within an EC-Workflow

- Comments in Workflow Tasks
  - For Review Tasks: Comments are optional
  - For Approval Tasks: Comments are mandatory
- Creation of Open Issues within ECO Phase
- Activity Stream

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Engineering Change

- What CAD models are affected by a change?
- Have all departments and locations evaluated the change?
- Have the specified tests and trials been carried out?
- What were the results?
- Which development status was the last design review based on?
- Which status was the current tool design based on?

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Change Management

- To summarize, the planning, analysis and tracking of engineering changes is indispensable. They must be systematically documented and communicated if various processes are in progress simultaneously, such as design engineering, simulation, toolmaking, prototyping or production scheduling.

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Engineering Change

- Engineering Change Lifecycle: Request (ECR), Order (ECO) and Notification (ECN).
- Template management for various change scenarios: Fast Track, Standard etc., depending on the product maturity, for example.
- Direct access to the work objects changed or to be changed, such as parts, documents, and models.
- Significant acceleration compared to paper-based circulation procedures.
- High level of clarity due to briefcases for all relevant work objects, test results, modification notes, order documents and other accompanying documents, such as cost calculations.
- Automation and assistance, e.g. using automatic notifications or collective release of the relevant parts, documents and models.
- Ensuring consistency in a rule-based manner. Example: Completing all changes before full EC release.

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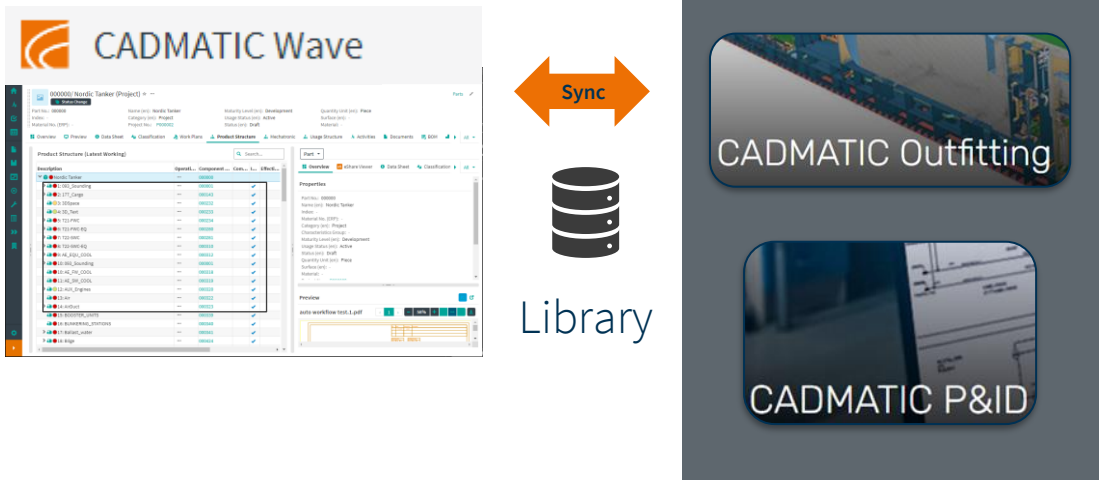
Integrated Library Management

Summary and benefit

CADMATIC Wave, based on CONTACT Elements, uses library management in early ship design to centrally manage standardized components and materials in the modelling and procurement processes by integrating CADMATIC Design Applications. It enhances collaboration between Engineers and Designers, reduces errors, and contributes to the successful delivery of high-quality vessels while ensuring regulatory compliance, and optimizing the use, costs and sustainability of ship designs.



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