Specific Adaptations to Change and Configuration Control - Case Study based on a large EPC Project in the Nuclear Business

Beate Kastner (Speaker), Steffen Mörler

NESTet 2016

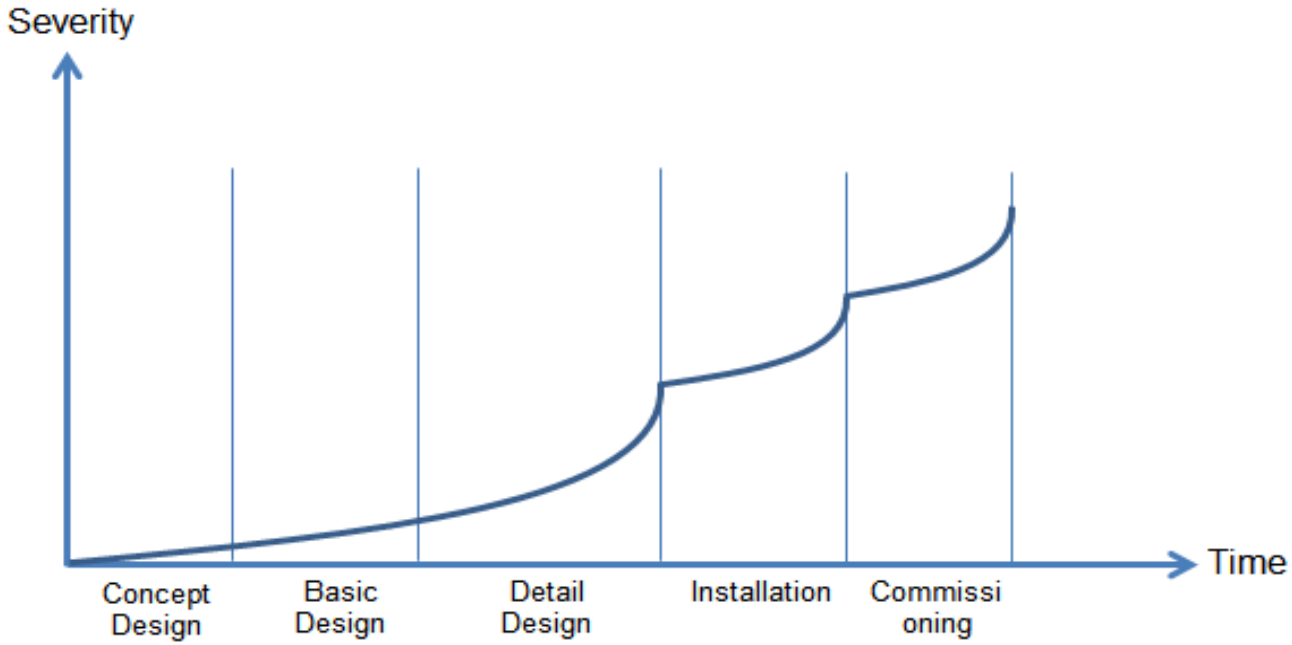
Berlin, May 24th 2016

AREVA

Changes – Generic Facts

- **A significant number of projects is affected by time or cost overrun during project execution**
- **All projects - independent from the industrial area - are affected by changes during project execution**
- **Change requests can be triggered by all stakeholders**
- **Project objective: to minimize the impact on scope, schedule and/or cost during project execution**
- **Depending on the size of the project the amount of change requests can differ from a small number to several thousands**
- **Demands from the regulatory bodies regarding traceability, verification and validation of changes makes it is even more challenging to handle modifications in projects within the nuclear industry**

Severity of Changes



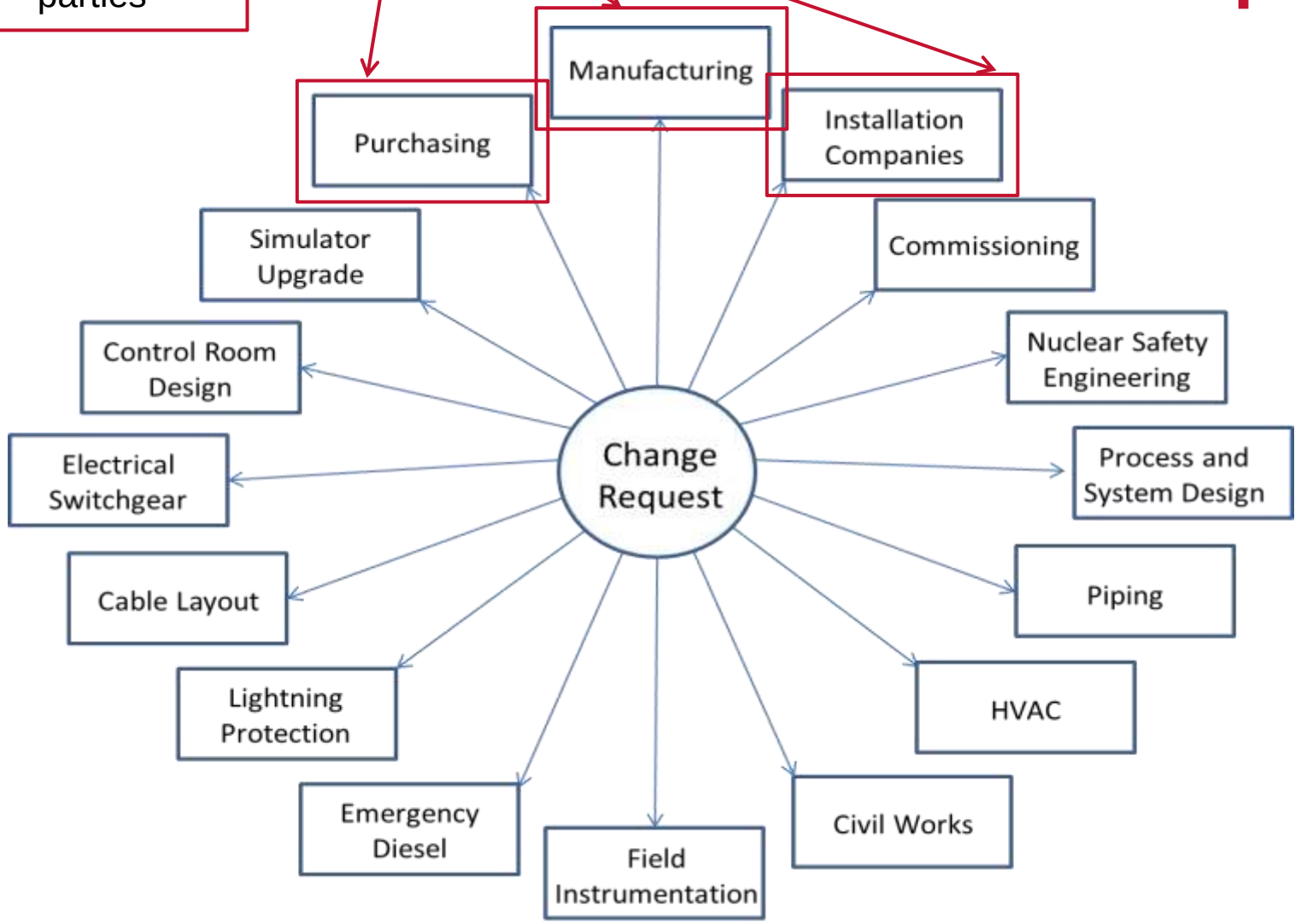
- **Is usually increasing towards the end of a project phase …**
- **due to the fact, that design and installation documentation which was already finalized, may be affected by the change …**
- **may also affect the ongoing installation or commissioning work and as a result create rework**

Case Study - Key Figures

- **Large upgrading project in nuclear power plant business**
- **Three party consortium**
- **Budget >> € 100 million**
- **Close to ten years project duration**
- **Several hundred people involved during project execution**
- **More than 250 suppliers and subcontractors involved**
- **Complex multidisciplinary interfaces with the existing plant systems as well as parallel ongoing modifications executed by customer and other contractors**
- **Unfavorable contractual environment hindering proper design freeze and allowing for continuous change and modification requests**

Areas of Impact

Potentially more difficult as involving external parties



Change Requests Categories

- **Adaptations**

  Changes in documents and drawings in case of obvious errors or mistakes with no significant influence to the installation and commissioning work (40% of the project change requests)

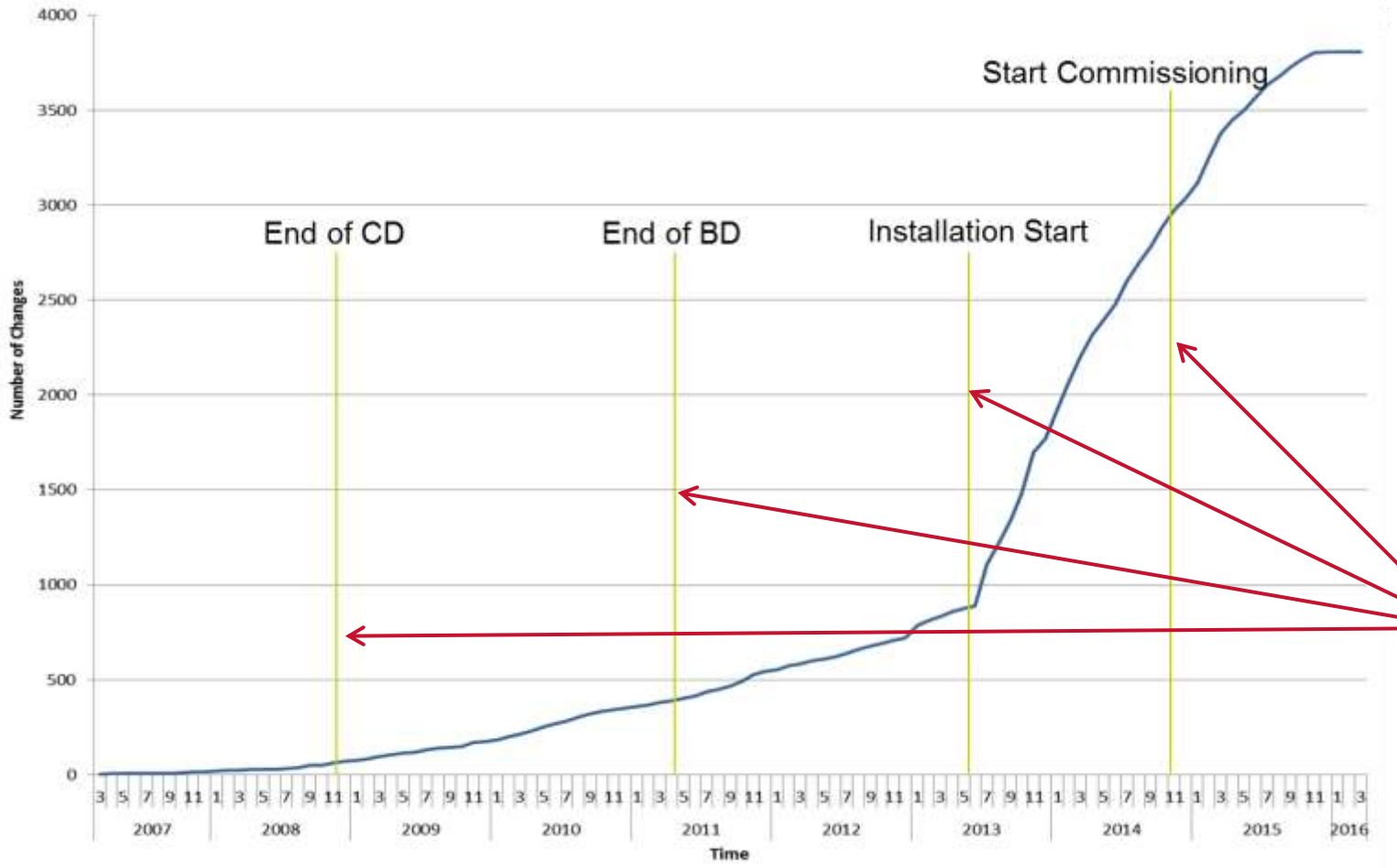
- **Modifications**

  Alteration of a system, component or structure of approved detail design in such a way that it is no longer meeting the requirements of the design bases (60% of the project change requests)

Change Control Process at Project Start

- **Change control via paper (signed technical change notes) and Excel list follow-up**
- **Standard Configuration Baselines**
  - **End of Concept Design**
  - **End of Basic Design**
  - **Start of Installation (= End of Detailed Design)**
  - **Start of Commissioning (= End of Installation)**
  - **As-Built (= Project Completion)**
- **Allocation of changes to baseline based on time when need for change was identified**

Change Requests Encountered During Project Execution



~3800 !

Original Baselines

AREVA

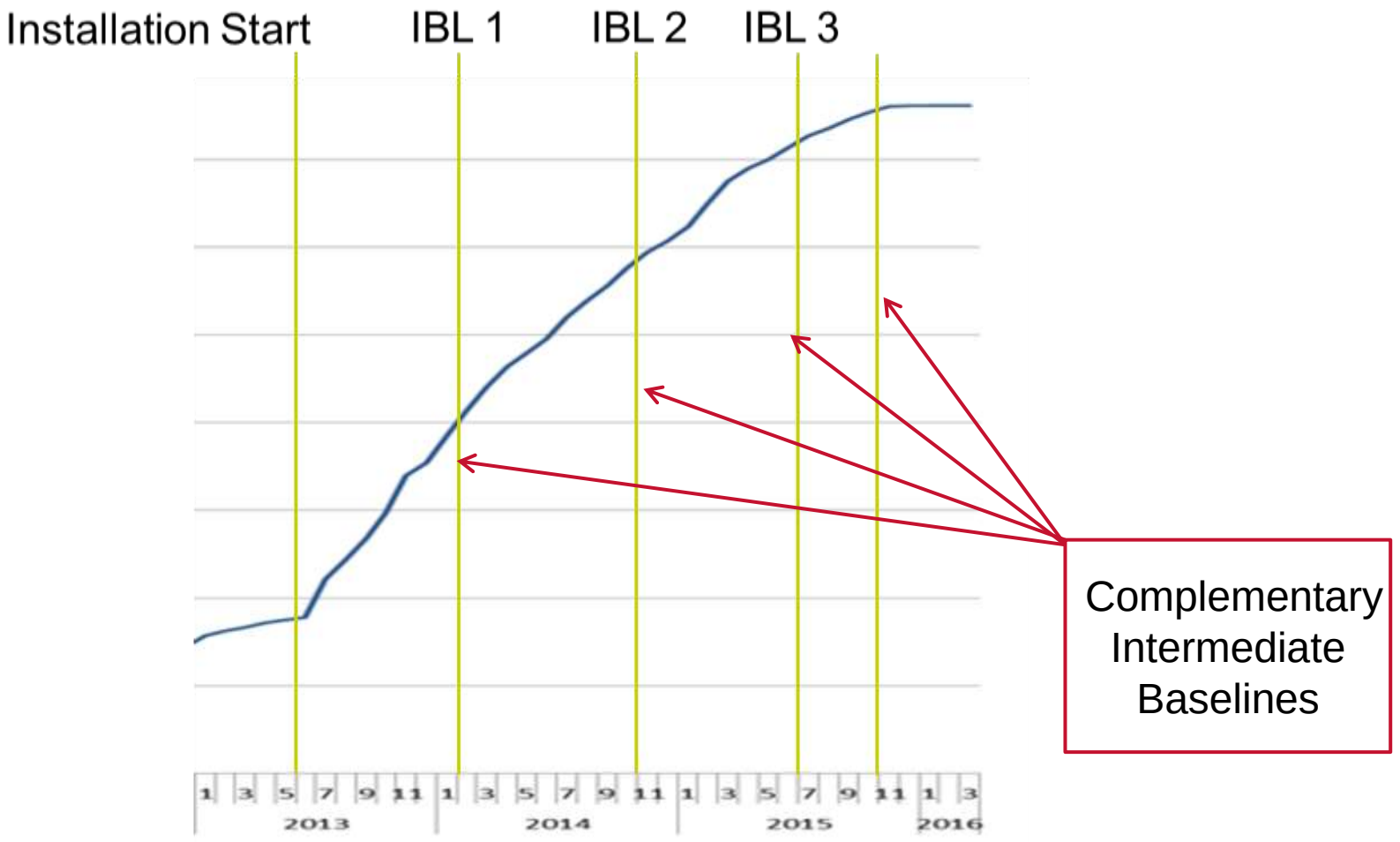
Improvement of Change Control Process

- **Step 1**
  - **Tool implementation (JIRA), web-based, easy-to-use**
  - **Creation of electronic change control process with mandatory feedback from all disciplines and identification of all related required subtasks to be performed (documents to be updated, material to be purchased, etc.)**
  - **Setup of Change and Configuration Control Board (4w interval)**
  - **Structured evaluation and release process**
  - **First demand for feedback on implementation of changes**

Reinforcement of Change Control Process

- **Step 2**
  - **Definition of complementary intermediate configuration baselines**
  - **Allocation of changes to <u>future</u> implementation baselines – based on project's physical needs**
  - **Shortening of intervals for Change and Configuration Control Board meetings from 4 weeks via 2 weeks to every 2 days**
  - **Reinforcement related to feedback of implementation from all involved disciplines to satisfy customer and regulatory demands for traceability and Verification & Validation (V&V)**
    - To ensure that all changes have been tested to satisfy need for verification
    - To ensure that all changes are reflected in final valid documentation.

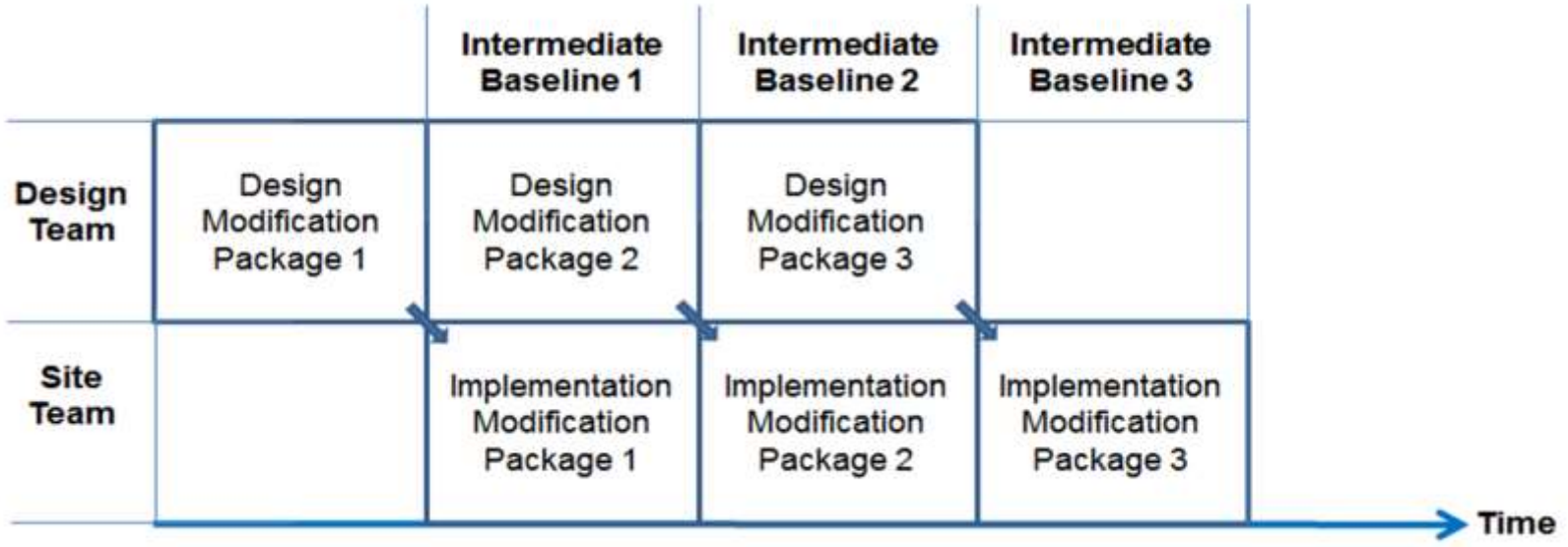
Intermediate Baselines



AREVA

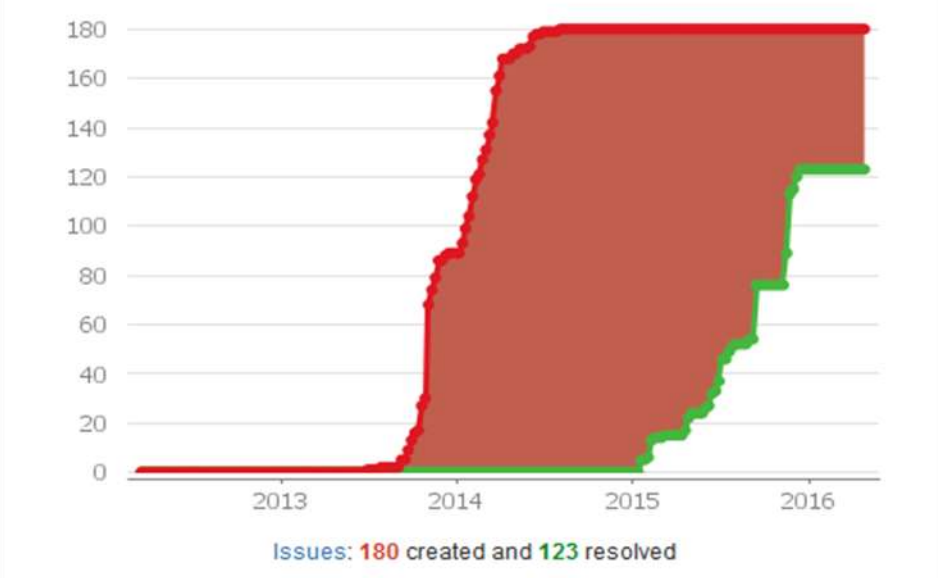
Baseline Approach

- **To avoid disturbance of site activities, a two-step release process for implementation of changes was defined**
  - **Step 1 releasing works to produce required design modification for upcoming intermediate baseline**
  - **Step 2 releasing works on-site based on respective design modification package**

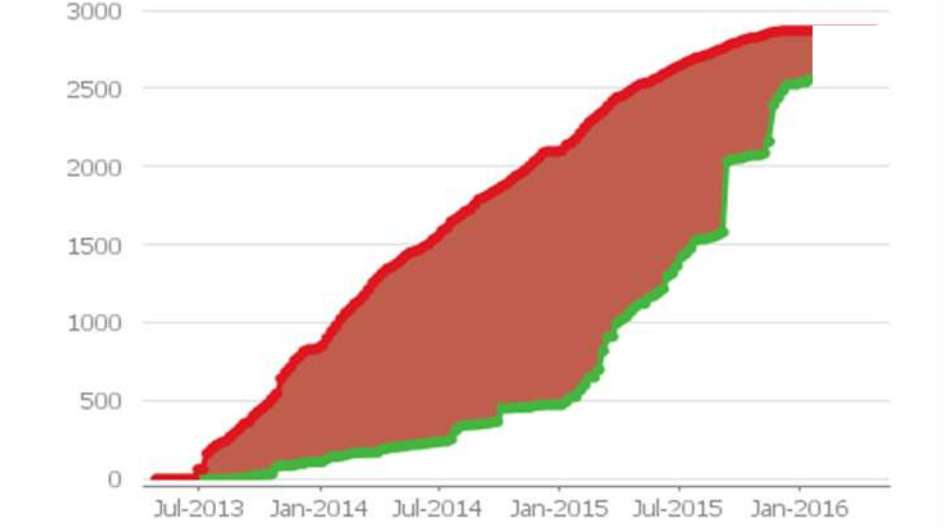


Reporting - Tool based Example 1

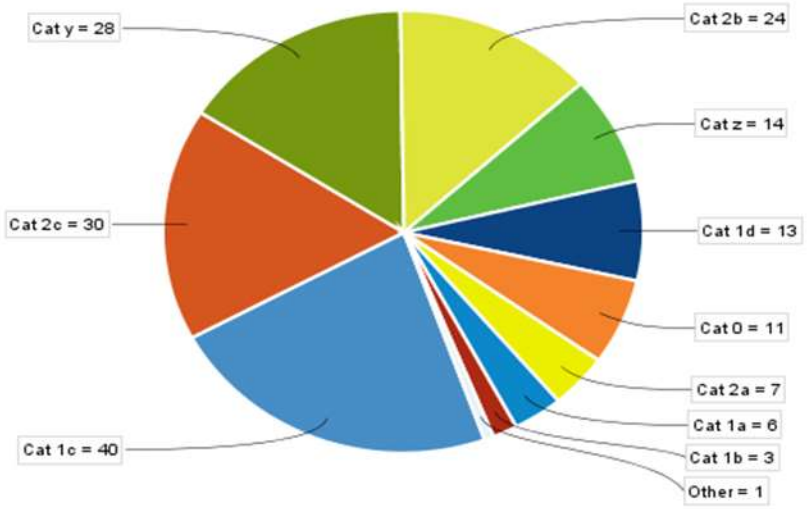
Created vs. Resolved Chart: Intermediate Base

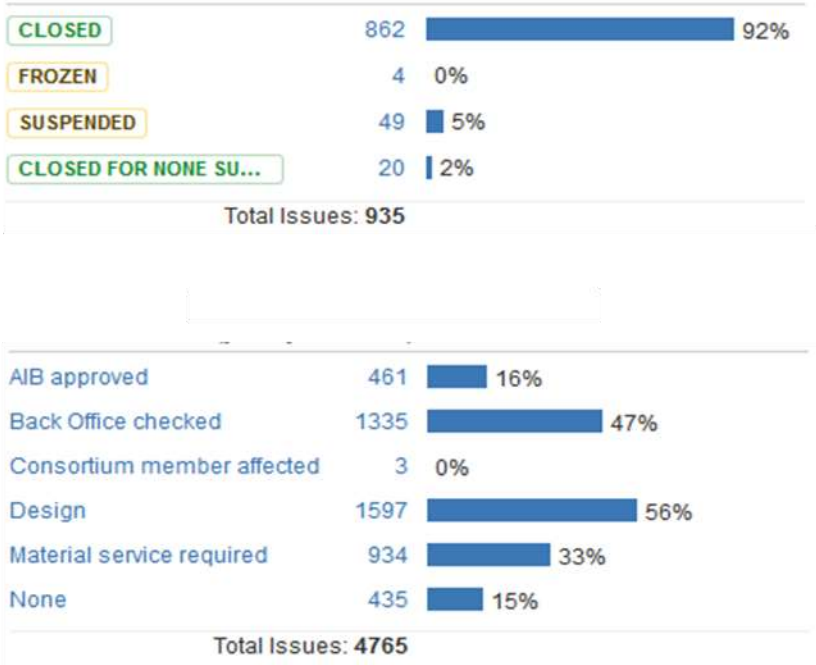


Created vs. Resolved Chart: Project



Reporting - Tool based Example 2





Conclusion

- **Change management and control is one of the most underestimated tasks, especially at the beginning of a new project**
- **In order to fulfil the demands from regulatory authorities it must be always possible to track changes and their correct implementation through all affected disciplines**
- **In order to mitigate the impact of changes, change and configuration control should be part of the project organization and processes from the beginning**
- **From observation and comparison with other large EPC projects, it seems favourable to have a defined way in which changes can be implemented into the design, installation and commissioning works**
- **A full stop of change implementation during site works for a longer period of time usually results in extensive rework (up to dismantling and new installation) thus increasing impact on time and cost, as it will delay when the point of time is reached, where the changes from technical perspective must be implemented**
- **Project management should not be reluctant to reinforce change and configuration control e.g. by adapting the way of handling change requests, introducing additional baselines, and even change the complete process, if necessary**