Managing Product Changes
CIMdata PLM Leadership Webinar Series
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#cimdatawebinar

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Questions?
Please use the GoToWebinar Question panel

- Please enter questions in the GoToWebinar Question panel
- We will answer as many questions as time allows...
- Those that can’t be answered live will be answered by email
Our Mission...
Strategic management consulting for competitive advantage in global markets

CIMdata is the leading independent global strategic management consulting and research authority focused exclusively on the PLM market.

We are dedicated to maximizing our clients’ ability to design and deliver innovative products and services through the application of PLM.

Presenters’ Profile
Your presenters’ professional background

- John MacKrell, Vice President
  - More than 40 years of experience in the application of computer-based solutions to engineering & manufacturing; has held senior positions in product management, marketing, research & development, and consulting with companies that produce PLM solutions & services
  - B.S. in Naval Architecture & graduate-level studies in computer science
Key Takeaways

What you should learn today

- What the issues are that impact changes
- What the benefits of working in the context of a single source of truth are
- How PLM helps external partners streamline their role in change processes
- How to use PLM to create a rational approach to managing change
- What some of the best practices are when implementing change management in your organization

Agenda

- What are Change & Configuration Management
- Key Change Process Issues
- Best Practices for Change Processes
- Using PLM to Support Best Practices
What is Configuration Management?

**ICM definition**

- Configuration Management
  - Establishing and maintaining the definition and status of products and their components, all associated information and the relationships among them
  - Managing all changes to any product, component or defining documentation in an auditable, repeatable, verifiable, controlled manner
  - Keeping track of what you design, develop, deliver, sell, and support

*Configuration Management is the process of managing products, facilities, and processes by managing their requirements, including changes, and assuring conformance in each case.*

The Institute of Configuration Management

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**CMPIC Definition**

Configuration Management is a set of inter-related processes, management techniques, and CM supporting tools that assures:

1. Our products, facilities, IT Systems, services, processes, etc., are what they are intended to be.
2. That changes to our products, facilities, IT systems, services, processes, etc. are properly evaluated, authorized and implemented.
3. That all information necessary to define and manage our configurations and data is kept:
   a. current and accurate.
   b. is structured for all users needs and,
   c. is readily available to all who need to know.
Configuration Management Benefits

Why you should spend the time and money to implement Config. Mgmt.

- Provide measurable performance parameters
- Decisions are based on correct, current information, enhancing production repeatability
- Applicable data (such as procurement, design or servicing) is accessible, avoiding guesswork and trial and error
- Downstream surprises are avoided; significant cost and schedule savings can be realized
- Control the implementation of change (proactive & not reactive)—avoiding costly errors of ad-hoc, erratic changes
- Timely, accurate info. avoids costly delays & production down time; ensures proper replacement and repair

What is Change Management?

We use Change Management processes to manage changes to configurations

- A methodology to manage changes to the product configuration during its lifecycle process
- Enforce:
  - Standard processes
  - Traceability
  - Completeness
  - Validity
  - Approval
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Change Management

*Primary concepts*

- Managing change is critical to controlling product evolution & product configurations
- We need changes to fix things & to improve things & for many other reasons as well
- Configuration Management is the framework in which changes take place
- Changes come from internal as well as external sources
- Change Management begins at the start of the product life cycle & continues throughout the life cycle
- Changes need to be managed & tracked from start to finish

Key Change Concepts

*As espoused by the ICM*

- Encourage change
  - Keep changes small and simple to minimize required approvals & time lags
- 3 steps—change request, change order, change notification
  - Consider adding 4th step, problem report, to the beginning to allow anyone, including customers and suppliers to submit issues.
- Lead the process with documentation—what the change is intended to accomplish, why, how, cost
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  - Best Practices for Change Processes
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Business Issues Driving Change

Managing change provides critical support (1 of 2)

- More effective control of product development, product production, sales & marketing, and support & maintenance
- Support use of global virtual teams
  - Controlled access to clear, concise & valid shared product information
- Agile design and manufacturing
  - Rapid change impact analysis
  - Better able to standardize parts
  - Higher design reuse
  - Reduce part complexity
- Reduce downstream changes
  - Less scrap and rework

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Business Issues Driving Change
Managing change provides critical support (2 of 2)

- Maintain extended lifecycle products
  - Changes to update airframes and avionics to extend life and increase efficiency of aircraft for 30 to 50+ years
- Control & support regulatory compliance & safety
- Product liability
  - Evidence of due care & diligence
- Drive for mass customization & personalization drives more product configurations (variations)

Why You Need Change Management
Audit findings from many businesses – do you recognize any of these?

- Changes “pushed out” without proper authorization
- Not all changes are being tracked
- Baselines not established or not being updated
- The right people are not involved in the change process
- Full impact of change unknown first time around
- Thorough change evaluation not being done
- Traceability is weak
- Change process takes too long
- Metrics not being tracked or reported
- Personnel working on the wrong Information
Change Process Failures

What causes change processes to fail (1 of 2)

- Change is too tightly controlled during WIP
  - Data is left vulnerable, outside control of the PDM vault
  - People work around the process
- All changes are treated equally
  - Process is delayed due to over complication
  - Different levels of changes should receive different levels of control and sign-off—more complicated or costly—more control
- The process is not “closed loop”
  - The person who requested the change needs to know it was resolved
  - Other people need to be notified as well

Change Process Failures

What causes change processes to fail (2 of 2)

- Changes are not always tracked against all of the data they impact, such as labeling, artwork, and packaging
  - Change is incomplete
- Change process is complicated when external partners have to be involved in decision making
  - Fail to gain complete understanding of change impact
  - Companies do not provide external partners enough access
- Determining the cost of a change is often difficult—many times people lack access to cost data
  - Changes delayed due to fear of costly mistake
  - Changes undertaken without understanding lifecycle cost
### Evaluating Changes

**Questions you should ask:**

- Which products does the change potentially impact?
- Does the change impact security?
- Does the change offer value?
- What is the impact on cost?
- Is the inventory impact clear?
- Will the design have to be resimulated or retested?
- Will part interchangeability, replaceability, or sustainability be effected?
- Do part suppliers need to be changed?
- Is there a regulatory impact from the change?
- Which documents are effected?
- How does the change impact performance and reliability?
- Does the change modify internal or external interfaces?
- How does the change impact the current work, scope, delivery, & schedule?
- Is compatibility with other parts impacted?

### Thoroughly Understand the Impact

**Do not make a change without understanding its “cost” to the product**

- Formally analyze the impact of change on the product across the lifecycle and the supply chain
  - Including technical and commercial considerations
- Consider the following criteria when assessing a change:
  - Demand & sales
  - Cost & inventory
  - Regulatory compliance & validation (safety)
  - Manufacturing process changes
  - Impact on related product items (higher-level assemblies, item used in multiple products, fit & function...)
  - Reliability & performance
  - Packaging & labeling
Changing Part Number or Configuration

*What constitutes a required change*

- **Form**
  - The shape, size, dimensions, and other physical measurable parameters that uniquely characterize a product
  - For software, form denotes the language and media

- **Fit**
  - The ability of an item to physically (or programmatically) interface with or interconnect with or become an integral part of another item

- **Function**
  - The action or actions that an item is designed to perform

- **Traceability**
  - For products that are serialized or batch identified

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Simplifying the Change Process

*Applying processes appropriate to change risk and complexity – ICM*

<table>
<thead>
<tr>
<th>CHANGE ACTIVITY</th>
<th>CHANGE CATEGORY</th>
<th>BUSINESS DECISION</th>
<th>PLAN AND IMPLEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 - 85%</td>
<td>Simple and Low Risk</td>
<td>By Individuals</td>
<td>By Individuals</td>
</tr>
<tr>
<td>15 - 20%</td>
<td>Complex and Medium Risk</td>
<td>By Standing Board of Management Rep's</td>
<td>By Standing Board of Functional Specialists</td>
</tr>
<tr>
<td>0 - 5%</td>
<td>Complex and High Risk</td>
<td>By Special Board Including Top Management</td>
<td></td>
</tr>
</tbody>
</table>
CMII Closed-Loop Change Process

Fast track & full track are same process, just different no. or seniority of approvers

Four Key Control Points

1. The review and disposition (approval or disapproval) of each enterprise change request (ECR)
2. Planning & implementation of approved ECRs
3. Validation of new & revised information to be released
4. Work authorization allows the use (application) of the changed data
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- What are Change & Configuration Management
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- Best Practices for Change Processes
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Change Management Best Practices

*What to focus on (1 of 3)*

- Change is managed proactively within the product development environment
  - Multiple changes are encouraged early in the product lifecycle where they are very inexpensive
  - Changes are managed so that the true impact of a change is always well understood (implies access to product data including cost, inventory, ...)
- Incomplete but accurate product design data is valuable to supply chain processes
  - Productive work can be done on product and process definition information that are accurate but not complete
  - Retaining (restricting access to) definition information until the design is complete reduces the enterprise’s agility
Change Management Best Practices

What to focus on (2 of 3)

- Owners of data are identified as responsible for changes to that data
  - All product and process definition information has owners who are responsible for understanding the impact of change on the data elements they own
  - Owners must understand how their data elements are related to other product definition information
- Users or owners of the item being changed should approve, not a manager
- More than 3 or 4 approvers are typically not necessary
  - Typically, once key approvers sign off, everyone else follows along anyway
  - If people feel the need to know what is happening, use notifications

Change Management Best Practices

What to focus on (3 of 3)

- Product changes must be communicated throughout the enterprise and to extended enterprise participants as required
  - Proposed and approved changes are communicated at the right time, to the right people, wherever they are located
- Take a holistic approach to change management—allowing you to better understand the impact of a change in all forms
  - Implement a PLM solution that manages the bill of information at its core
  - Provide access to external information (e.g., cost) via PLM’s interface
- View change management as part of a comprehensive configuration management activity
  - Supporting technologies are no good if they are not used within the proper process environment
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PLM for Change Management

Best practices as defined by CIMdata (1 of 3)

- PLM provides one master bill of information
  - A physical information structure with multiple logical views, such as “as-designed,” “as-planned,” “as-assembled,” “as-delivered,” “as-maintained”

- This master BOI is managed by one system and it feeds product configuration information to all other systems
  - It is the system of record

- It is the source for information critical to assessing change impact

- PLM can proactively warn of problems & delays in change processes
  - Provides metrics to gauge success
PLM for Change Management

Best practices as defined by CIMdata (2 of 3)

- PLM workflows control & assure process adherence
  - Can support both fast track and normal track versions of workflows
  - Streamline change processes & signoffs
- PLM provides visibility to product and process change information so that it can be managed strategically during all phases of the lifecycle, thereby reducing the total cost of change
- PLM supports visual collaboration during product change, with visualization and virtual meeting technology

PLM for Change Management

Best practices as defined by CIMdata (3 of 3)

- PLM Provides Traceability
  - The goal is to achieve end-item traceability on all changes without compromising the rules of interchangeability and to do so cost effectively
- PLM integrates with ERP & other systems to provide access to other data (cost, inventory...)
Concluding Remarks

Expanding PLM presents many opportunities to improve process operations

- Embrace & encourage change—changes help make better products
- Learn about PLM—understand how it can support change processes
- Understand your change process and business rules when implementing PLM
- Use PLM workflows to drive consistent change processes
- Track change problems & other metrics via PLM

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  - Technology research & analysis
  - Reports & publications
  - Market news
  - Member services...

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  - PLM Certificate Programs
  - Technology seminars
  - Int’l conferences & workshops
  - Best practices training...

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  - Needs assessment
  - Solution evaluation
  - Best practices
  - Quality assurance
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  - Market planning...
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CIMdata PLM Leadership
PLM Industry’s most comprehensive non-biased education & training offering

CIMdata’s certificate program is primarily comprised of a set of well defined, assessment-based PLM education and training classes.

These certificate programs are available to industrial companies who are considering and/or implementing PLM, and to PLM technology and service solution providers.

PLM Certificate Program Outline
5-day, 9-session outline for PLM Leadership offering

● Day 1: Session 1: Introduction to PLM
● Day 2: Session 2: PLM Benefits & Potential Value
      Session 3: PLM Strategy & Solution Definition
● Day 3: Session 4: PLM Solution Evaluation & Selection
      Session 5: PLM Implementation, Monitoring & Continuous Improvement
● Day 4: Session 6: PLM Process Development & Testing
      Session 7: Integrating PLM within the Enterprise
● Day 5: Session 8: Expanding PLM Across the Value Chain
      Session 9: Configuration Management’s Role in PLM

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What Others Are Saying

*A sampling of feedback received from past certificate program participants*

“A must attend program for anyone that is planning to participate in PLM selection or implementation activities at their organization.”
—Shinod Kumar, Edwards Lifesciences, USA

“An excellent overview of all PLM and it’s fit to companies. Good insights that can avoid many troubles in implementation.”
—Paulo C L Villaca, Embraer, Brazil

“I wish we had done this before we started our PLM effort...”
—Jeff Burk, Whirlpool, USA

“Hazy about PLM? Come to CIMdata and clarify.”
—Mrs. B. Uma Prasad, Bharat Heavy Electricals Ltd., India

2015 PLM Certificate Class Schedule*

*Dates are subject to change*

Join us, to understand how PLM can help your organization

- March 16-20 – Amsterdam, The Netherlands *(completed)*
- May 4-8 – Ann Arbor, MI USA *(completed)*
- September 21-25 – Boston, MA USA
- December 7-11 – Cypress, CA USA

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