

NOTES FROM
THE FIELD
VOLUME 1

ENGI NEER 24 ING CHANGE

PIECES
OF PEER
ADVICE

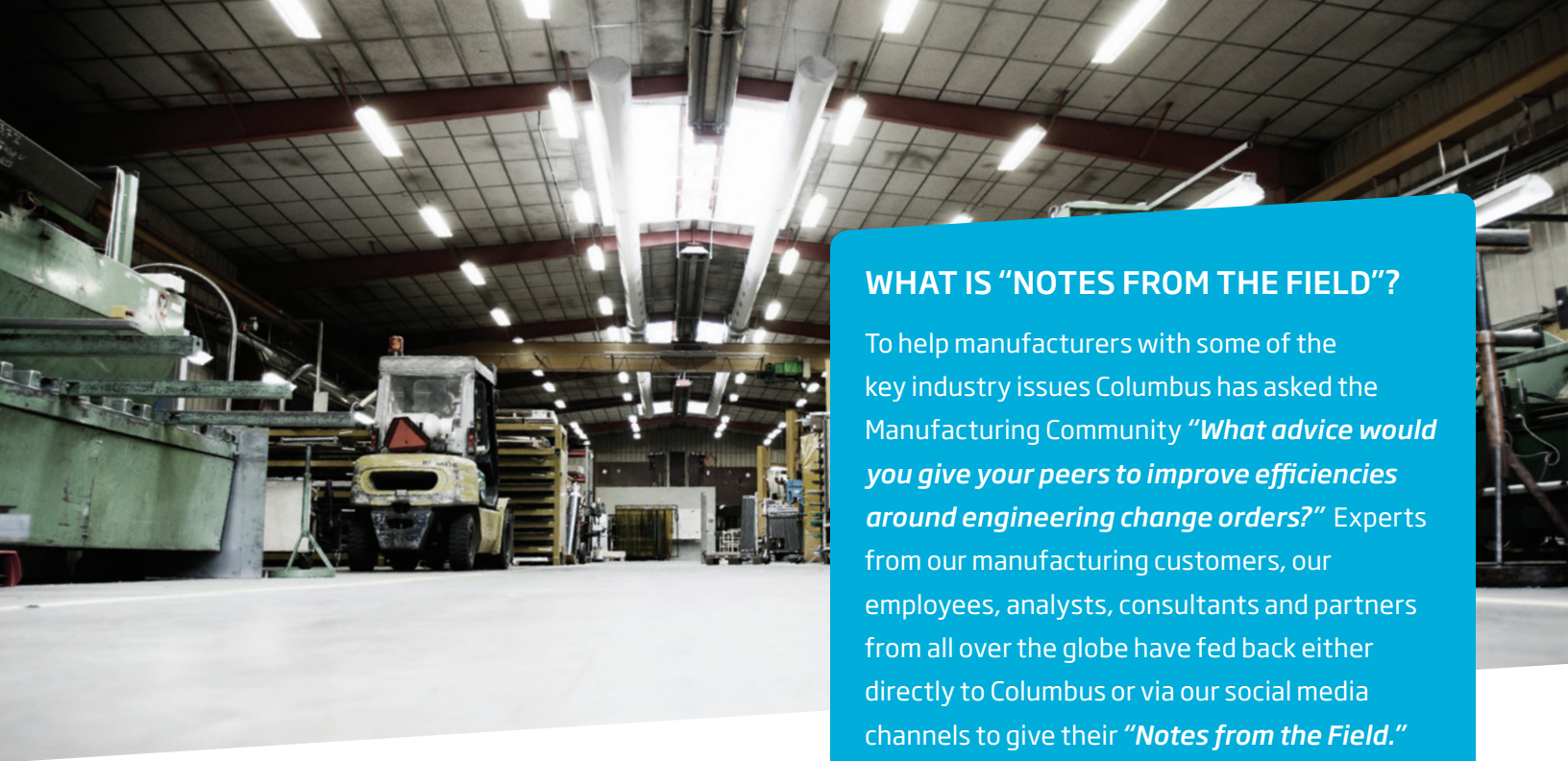
*Improving
efficiencies around
engineering
change orders*

PRACTICAL ADVICE

from manufacturing experts on solving critical issues.

Columbus Manufacturing®

Once you know how...



WHAT IS “NOTES FROM THE FIELD”?

To help manufacturers with some of the key industry issues Columbus has asked the Manufacturing Community “*What advice would you give your peers to improve efficiencies around engineering change orders?*” Experts from our manufacturing customers, our employees, analysts, consultants and partners from all over the globe have fed back either directly to Columbus or via our social media channels to give their “*Notes from the Field.*” We received hundreds of responses which were distilled into this document which we hope you will find useful and interesting.

ENGINEERING CHANGE

One of the biggest challenges discrete manufacturers’ face is delivering Engineering Change Orders (ECO) to manufacturing. It is not uncommon for a company to have 10, 100, or even more ECOs for a new product. In a situation like this, there will be multiple changes to production processes, raw material specifications, quality inspections, and more. If this process is managed through traditional

tools like email or home-grown data bases the result is clear, many costly mistakes will be incurred. In such a situation, it is also very difficult for manufacturing operations to provide feedback to engineering to help them improve products and production process design over time based on real world not simulated results.

Q = *What advice would you give to your peers on improving efficiencies around engineering change orders?*

“ Have a clear process to manage the stages and gates the products go through as it progresses in its lifecycle. It is important that not only engineering aspects are accounted for in a PLM system for instance but also on the transactional ERP system as well, so new released versions can trigger actions to previous versions. Older versions can be prevented from being ordered or in critical cases production orders can be stopped so new versions are put in place.”

LUCIANO CUNHA, *United States*

“ Look at your processes and try to assess the following areas:

- *Can you remove any unnecessary labor requirements to manage tasks related to research and control of required changes which creates a large amount of non-value add activities to your company's process.*
- *Look for bottlenecks and timeline delays due to over-reliance on different departments collaborating across the processes.*
- *Use newer data driven tools to remove excessive paper documentation due to home grown and manual systems often used to manage and communicate the change.”*

NORMAN CARMICHAEL, *United States*

“ Limit the signatories to those actually needed and exclude those who want to see them ‘for info only’. Remember that the signatories for different types of ECOs can vary: e.g. If there are no cost implications, costing does not need to know or sign-off. Secondly, if you use an MRPII or ERP system, check what it can do for you in terms of circulating the ECOs and updating appropriate files automatically when sign-off is complete.”

SAM GRAHAM, *Spain*

“ Using an ERP system allows you to become electronic. ECR's can be created by anyone and Engineering can collate these and determine whether an Engineering Change Order should be created to change the product version or BOM version, or both. Using workflow gives you far better control. Being able to see dependencies and affected orders WIP, enables quicker turn around to change product BOMs, reducing cost and Inventory especially for recalls of product.”

ASHLEY DOUST, *United Kingdom*

**Use workflow
and keep it simple.**

KEN JARLFORT, *Denmark*



“ Create closed loop feedback between manufacturing and engineering. ”

ANONYMOUS, United States

“ Set standard response times and regular status reviews for ECO’s based on levels of severity and technical complexity. Regular review and response expectations will help prevent minor issues from turning into major product recalls. ”

CHRISTOPHER JOHNSTON, United States

“ It’s extremely important to manage how ECO’s are implemented so that pending obsolete materials are used before being phased out and that new materials are incorporated into the master plan to avoid shortages. ”

JEFF POWELL, United States

“ Immediately evaluate the potential engineering changes, the precise time and conditions, the necessity for additional purchase of equipment and evaluation of unused stock and semi manufactures’ remnants. The preparation of prototype products, description of job instructions and process is necessary. By planning production and stock orders a company seeks for a constant evaluation of the risk, occurring to unused stock remnants due to the future engineering changes. It is important to evaluate the effective use of equipment, work-time optimization. ”

JOLANTA ŽALŪDIENĖ, Lithuania

“ Make sure that you have the capability to track changes, and manage the impact these changes will have on the organisation e.g. the dependencies such as outstanding orders before changing. ”

JOHN ROBINSON, United Kingdom

“ Closely monitor implementation of change orders. Monitor engineering more effectively with ECO aging functionality, ensuring that authorized changes move forward expeditiously. Engineering change orders may also require an estimate of schedule impact, if the engineering change order affects part-ordering schedules or construction-build schedules. ”

ANTONY PRABHATH, UAE

“ When you have the same products in a multi company enviroment it is important to easily maintain your product changes and requests across the companies. ”

EVA FOSS, Norway

“ To get the most benefit from this manufacturers need to consider what drives the requirement to make a revision uplift on their critical components, the old adage “form / fit / function” needs to be the driver. Some manufactures will need to move away from a “drawing centric” change control system, towards a more comprehensive “product version” engineering change control system that considers all aspects of the component that could affect its performance (form / fit / function), the drawing reference, the bill of materials and the production operation routing. Often the latter of these gets left unrecorded, but a later component failure could occur because production was moved onto a different machining centre for example.”

DAVE WARD, United Kingdom

“ ERP solutions can provide a consistent workflow process to capture the entire lifecycle of engineering change management. These can include processes to capture a holistic and documented view of engineered products across their lifecycle and provide information to relevant stakeholders.

VICTOR WASCHTSCHENKO, United States

“ If there was ever a business process designed for automation it is the ECN process (okay, maybe the Purchase Requisition process too!). Automating the ECN process not only significantly reduces the time required to complete the process, but also dramatically improves your ECN auditing and analysis capabilities.

TOM NALL, United States

“ Be clear that there are two different processes:

1. Engineering Change Request that could come from anyone and may or may not really require or merit an engineering change. We are using SharePoint to communicate and manage this system.
2. An Engineering Change Order - when it has been agreed that a change is required and this needs to be managed through the engineering system and then through the business system.”

ANONYMOUS, United Kingdom

“ Integration with PDM systems.

RUNE KINDEN SJURSEN, Norway

Lighting system manufactured by Urbis Lighting Limited, a Columbus customer



“ Some ERP solutions can give a good overview and full history of changes and versions of a product, with full traceability backwards and with the possibility to block outgoing versions on different levels. **”**

MORTEN SKOGBROTT, Norway

“ Engineering Change Control gives you ready access to documentation on prior product versions. In this manner, you can address questions relating to product defects in older product versions. Comprehensive ECC documentation also enables you to easily revert to the production of prior product versions, if necessary, to suit the requirements of a particular customer or conform to regulatory requirements. **”**

KURT HATLEVIK, Norway

“ Strong integration between your Product Lifecycle Management product and ERP to handle the process of product changes will achieve less manual work and improve accuracy in the overall process. **”**

OLAV BÆKKEN NATVIK, Norway

“ Implement a system that has full integration to Projects/Sales/Purchase Orders as well as Production. That way an Engineering Change Order request can be initiated anywhere in the organization and paper flow between departments can be avoided. **”**

HENRIK DALL, United States

“ The key to faster releases of new product versions and higher efficiency in the change order process is to improve coordination between engineering and manufacturing. Involve everyone in the change process early on and ensure full documentation and visibility to all changes. Experience tells us that most of the time is lost moving data and seeking input and approvals from our departments. A central repository and strong system support will greatly improve the coordination and ensure faster time to value. **”**

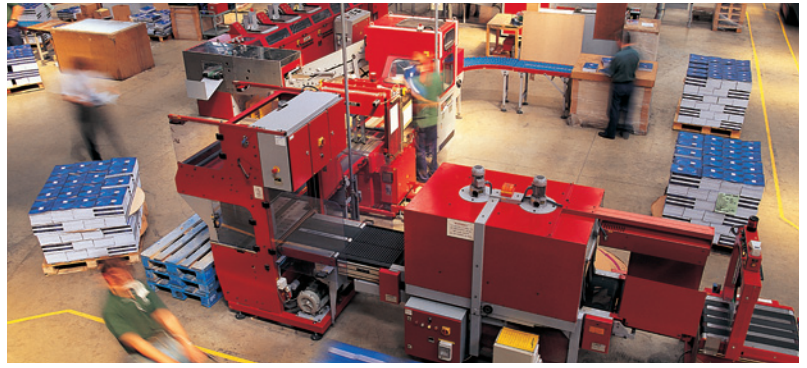
THOMAS HAUGE, United States

“ There is ERP functionality that specifically addresses engineering change orders where users can change multiple items in one ECO with the whole process managed by workflow. “Where used” logic determines the items to be included in your ECO. **”**

ROB TERRY, United States

- 1.** Design processes - to link the problem analysis, need for engineering change and change orders.
- 2.** Ensure version control for products.
- 3.** Capture complete details to be mapped in engineering change orders.
- 4.** Generally change orders are built around existing products/ product version - design the control mechanism which will track the status of current product version item across the supply chain value stream.
- 5.** Based on step 4, design the mechanism for introducing the new version arising out of engineering change orders.

NIRAJ NANDA, INDIA



HOW CAN COLUMBUS HELP?

COLUMBUS PRODUCT ENGINEERING

Columbus Product Engineering, part of the Columbus*Manufacturing* ERP solution, integrates engineering with all operations through centralized, role-based information, end-to-end product lifecycle management, and workflow-driven change management.

Engineers can collaborate with teams and departments to reduce risk, understand and quickly respond to changing demands, and focus on innovation rather than re-engineering.

Columbus Product Engineering enables you to optimize control, efficiency, and quality by managing products across their entire lifecycle. Manufacturers are able to monitor all stages, from small series prototyping through large volume production and phasing out the product. You can also maintain complete traceability, including insight into change history for bills of materials and routing data, with embedded product version management.

BENEFITS

1. RE-USE SUCCESSFUL PRODUCTS:

Powerful search capabilities and data archiving make it possible to find alternative products and match attributes with requirements, eliminating the need to start from scratch.

2. GIVE ENGINEERS QUICK INSIGHT INTO PRICES, OPEN ORDERS, AND PREFERRED VENDORS:

Speed up the flow of data from your engineering department to your commercial departments by leveraging built-in integration points for PLM systems.

3. REDUCE RISKS INHERENT TO CHANGE:

Get a grip on engineering change through a managed process that involves all stakeholders in a workflow-driven process and addresses all relevant issues.

4. CONNECT ENGINEERING TO PRODUCTION AND LOGISTICS:

Give engineers real-time insight into the impact of their design choices so they can understand consequences and choose alternative options that reduce production costs and align with open orders and existing materials.

5. MAKE COSTS FOR ENGINEERING PART OF YOUR PRODUCT PROFITABILITY ANALYSIS:

Eliminate uncertainty over the true costs of sales for engineer to order products, so that you can leverage smart decisions and plan more effectively for future projects.

The full Columbus*Manufacturing* solution includes our best practice business process modeling with *RapidValue*, our own Advanced Discrete Manufacturing and Supply Chain Solution modules, Microsoft Dynamics AX, and our proven implementation methodology, *SureStep+*.

Columbus *RapidValue*®

Columbus *ADM*®

Columbus *SCS*®

Columbus *SureStep+*®

A big **THANK YOU** to everyone who has contributed to the Manufacturing Notes from the Field including:

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Once you *know* how...

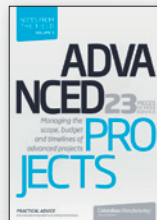
The Columbus *Manufacturing* Notes From The Field Series:



Volume 1
Engineering Change



Volume 2
Sales Quotations



Volume 3
Advanced Projects



Volume 4
Plant Maintenance



Volume 5
Service Management



Volume 6
Supply Chain

ABOUT COLUMBUS:

Columbus is the preferred business partner for ambitious companies worldwide within the food, retail and manufacturing industries. We exceed 20 years of experience and 6,000 successful implementations, and we're proud to offer our customers solid industry know-how, high performance solutions and global reach.



'Columbus' is a part of the registered trademark 'Columbus IT'

Columbus[®]