Bring Order to Engineering Change

The Executive’s Guide to Managing ECOs

Change requests and change orders are critical components of effective product development — yet many small and medium-sized businesses still manage these processes using sticky notes, email, spreadsheets, or home-grown solutions. Learn how automating the change process can improve your business without stressing your staff or budget.
Bring Order to Engineering Change

The Executive’s Guide to Managing ECOs

Change requests and change orders are critical components of effective product development — yet many small and medium-sized businesses still manage these processes using sticky notes, email, spreadsheets, or home-grown solutions. Learn how automating the change process can improve your business without stressing your staff or budget.

by Nancy Spurling Johnson

“Time is money,” said the wise Benjamin Franklin. And two-and-a-half centuries later, the adage couldn’t ring more true — especially in the lean-and-mean world of manufacturing. Every wasted minute in the product development process makes a dent in the bottom line.

For many small and medium-sized businesses (SMBs), wasted time manifests itself particularly during the engineering change process, where ineffective, outdated solutions are often the norm for managing change requests and change orders. Engineering talent can end up being diverted and distracted dealing with the minutia of an inefficient change process, and while management struggles to understand the information needed to make timely decisions, production stalls and product quality suffers.

Can your business afford such waste? Of course not.

Effective change management is good for business — and it’s within reach of every SMB. This whitepaper discusses why every successful SMB must actively control this process and introduces a solution that is effective, affordable, and right-sized.

Change Management: The Bad and the Ugly

Every product development process has some sort of change management system — some very good, some very bad. SMBs can be guilty of the worst offenses: ad hoc, paper-based, manual processes such as sticky notes, spreadsheets, and email. “While these are commonly used to process and track change orders and are better than nothing, they are often very ineffective,” says Carl Smith, Director of Manufacturing Services at IMAGINiT Technologies, a provider of Autodesk solutions, consulting, and support. “And home-grown systems become obsolete over time.”

Whether an engineering change involves a design iteration, software update, modification to the manufacturing process — or anything in between — wasted time and mistakes are sure to result when the workflow goes unmanaged, is disconnected, or is inefficient. Examples of the fallout include the following:

- When an engineering change request (ECR) or order (ECO) is not automated, staff must manually request input and action, as well as manually follow up to ensure completion. This not only leads to wasted time and headaches but risks...
redundancy or having a change move forward without essential approvals.

- ECRs and ECOs can be forgotten or lost, then left unaddressed.
- Information relevant to a given ECR or ECO is scattered among multiple sources.
- Change orders may not specify urgency or deadline, so action can be incorrectly prioritized.
- ECRs and ECOs lack sufficient detail, requiring downstream parties to repeatedly track down additional information.
- Change status, results, history, and financial impact are difficult (if not impossible) to ascertain.
- Mistakes result from poor communication, leading to rework in design, engineering, and/or manufacturing.

When the product lifecycle involves external partners, as is increasingly true in today’s market, the negative impact of poor change management can multiply.

Engineering change can consume one-third to one-half of total engineering capacity and can represent 20% to 50% of total tool costs in manufacturing, according to a study by researchers Christian Terwiesch and Christoph H. Loch. Ten years earlier, another researcher found that a third of the product development cycle is wasted on inefficient change processes.

In 2012, a study of 55 Brazilian companies from a broad range of market sectors found that engineering change management consumed about 53% of total R&D capacity. Respondents identified a lack of methodological support for change processes and communication as one of the biggest problems.

Given numbers like these, what company can afford to maintain the ECR/ECO status quo?

**Benefits of Automating Change**

On the other hand, automated change management can deliver substantial benefits for process, personnel, and the bottom line by controlling change proposals throughout the product lifecycle, including how they are reviewed, planned, and executed. Such systems aim to bring discipline to change processes and minimize disruption in important workflows.

For executives and managers, automated change management has great appeal for its business-level benefits.
Improved regulatory compliance. If you’re required to document change to meet ISO, FDA, or other standards, an automated system not only helps to ensure compliance but also streamlines the process, saving time and money.

Staff-related ROI. Manufacturing organizations employ talented, highly paid staff. If you’re not automating change management, Smith says, it’s very likely that your thought leadership is tied up dispensing change requests and change orders. “These are not the people you want spending time on non-value-added work. It means they’re not being productive and innovative.

“"If one of my top engineers is spending the better part of a day managing change requests and I can automate that process, it’s as if I’ve hired another engineer.”

— Carl Smith
IMAGINiT Technologies

"If one of my top engineers is spending the better part of a day managing change requests and I can automate that process," Smith adds, "it’s as if I’ve hired another engineer. When you free up engineering time, that’s a positive return on investment."

Instant insight and answers. “With automated change management, executive decisions are streamlined because the information needed is right there in front of you,” Smith says. Information and answers “are real-time, they’re instant.” For example, an automated system provides instant visibility of the most common and costly quality issues in your process and can help calculate potential cost savings of a change immediately and over time.

Is a change approved? Can you change inventory? “As an executive, I need to know if changes are complete so I can move manufacturing forward,” Smith says. “And I need the answer instantly, without waiting for replies to emails or a meeting on Monday morning.” Automated change management tells you instantly whether required approvals are still pending or who and what is needed to complete them.

Managers can include all relevant staff in the change process when the system is centralized and automated. With SMBs, Smith explains, “Sometimes a change process is open only to an exclusive club — those who are part of the chain of email, for example. But executives often see value in involving more people in improving a product or a workflow. You should have your entire organization included in your change management process.”

Effective change management means executives can breathe easier. “I’ve got all information in one place, I have a standardized change process, I have a workflow that we’re committed to and that everyone understands,” Smith says. The centralized, streamlined approach reduces downtime and means changes are often communicated and implemented earlier. A reliable, consistent change process yields improved product quality and innovation, a goal all manufacturers are eager to achieve.
Autodesk Fusion Lifecycle: The Answer for SMBs

Large organizations rely on traditional product lifecycle management (PLM) and engineering resource planning (ERP) systems to manage the change process — but those are far too complex and expensive for many SMBs.

Autodesk has a solution that delivers the benefits of PLM in a way that makes sense for small and medium-sized businesses. Autodesk Fusion Lifecycle facilitates the automation of change management and helps manage product data, product quality, bills of materials, new product introduction, and more. It is cloud-based, so it’s easy to implement and affordable, with subscription-model pricing and no capital expenditures or expensive training. This flexible solution allows companies to adopt only the components they require and configure them as needed. Fusion Lifecycle is easy to learn and use and is accessible any time from any Internet-connected device.

Fusion Lifecycle is part of the Autodesk Fusion cloud-based product development platform, which also includes Fusion 360 for 3D CAD/CAM/CAE and other tools. Fusion Lifecycle collects all product development information in one location — including product data, workflow progress, email archives, staff input, cost information, and much more — and makes it accessible to every authorized user.

Whether you use Fusion Lifecycle with Fusion 360 or another CAD solution, it delivers powerful functionality for managing change. Managers and engineers are relieved of change-related administrative tasks because the software manages the process automatically.

Formal and fast-track ECR/ECO workflows are built-in to Fusion Lifecycle and configurable, if you wish, to reflect your unique processes. Based on your established workflow steps, the system automatically guides each change from start to finish. Any step of the process can be set up to require a digital signature, or password, to ensure that the approved party is signing off.

Every user has real-time access to common graphical representations of these workflows, promoting broad understanding of process requirements, delivering real-time status information, and helping users quickly identify and resolve bottlenecks.

Companywide product and process insight enables stakeholders across your organization to quickly view and understand which parent assemblies and products will be affected by a change (and how) and provides access to details of related components and subassemblies.

» In Fusion Lifecycle, users can adopt the default change-automation workflows or configure them to reflect in-house processes.
Automated, user-specific change notifications and to-do lists keep processes moving forward without manual intervention. Those involved in each stage of a change process receive real-time notifications when that stage is reached, as well as reminders when tasks go unaddressed. To-do lists, unique to each user, link to full process details and required actions. Stakeholders not directly involved in a process can subscribe to notifications to be immediately informed when a change reaches a critical stage or is completed.

**How Fusion Lifecycle Helps Executives**

Autodesk Fusion Lifecycle is particularly powerful when it comes to providing business-level insight and supporting executive decision-making.

**Instant ECR/ECO status** is provided via direct access to data and reporting. How many change orders are in the works? How many have been completed? Fusion Lifecycle has the answers in real time, allowing you to release drawings or products, change inventory, move manufacturing forward, or take other critical actions without delay.
Financial impact of change is available immediately via Fusion Lifecycle. Executives can identify financial red flags as well as opportunities for cost savings. You can view the short- and long-term financial effects of change via real-time reports. Want to ascertain the potential savings of a change measure — say, adopting a less-expensive version of a bolt that occurs in a design 10,000 times? Fusion Lifecycle can provide the answer right away. Or, Smith explains, “as an executive, I could see that we had 50 change orders in a quarter, and I could see instantly, for reporting to my board, that those change orders had an effective ROI. Or, I could see that we’re going to take a financial hit this quarter, but will recoup the costs over the next six months. That’s the type of insight you get.”

Improved employee input makes for improved executive decisions, and Fusion Lifecycle enables that by allowing you to instantly request feedback about a proposed change from as many employees as you wish, rather than limiting the involved parties to avoid collecting emails and other time-wasting tasks. Fusion Lifecycle collects all input so you don’t have to.

Historical change traceability saves time if change-related issues arise later, and it assists with regulatory compliance. Fusion Lifecycle maintains an audit trail of each step of a change process — including who acted on it, when, and what feedback was provided — and makes it easily accessible to all authorized users.

Secure third-party change process participation supports closer collaboration with partners, suppliers, and even customers, helping to reduce lead times and the risk of errors due to miscommunication. For example, a strategic supplier could be part of an approvals board that reviews and authorizes a change.

Time for Change
If your company manually negotiates the engineering change process or uses an outdated home-grown platform, you’re likely wasting valuable engineering and executive time, unnecessarily delaying product development, and compromising product quality and your bottom line.

This waste in the product development process is costly, but it’s also avoidable. When you make the move to Autodesk Fusion Lifecycle, you’ll reduce the waste that results from an inadequate solution and reap the benefits of automation — from improved compliance and standardization to better executive decision-making. You’ll increase competitiveness because your key engineering talent can focus on quality and innovation rather than administrative tasks.

Even more good news: You don’t have to go it alone when implementing managed engineering change. IMAGINiT Technologies, which has a 20-year track record of successful software integration with companies of all sizes, can efficiently and cost-effectively help you reach your business goals. From defining workflows to supporting your staff as it adopts the new engineering change process, IMAGINiT can help at any, or every, step of the way.

Is it time for your business to automate change? Ben Franklin would advise you not to put it off. ✎