



An Arena Solutions whitepaper

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3 Tips for Effective Product Revision Control and Communication

whitepaper

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The ability to react quickly and make your own breaks is key to business success. But you cannot make a good pivot off a poor foundation. You are bound to fail when you press a system not built for speed to move more quickly than it can run.

This whitepaper tells the story of a quick to react company that stumbled and fell because of its lax revision control processes and its poor communications both internally and externally with suppliers and contract manufacturers (CM). This paper also describes how a collaborative bill of materials (BOM) and change management system like Arena could have saved this company from an expensive manufacturing disaster.

NO WALK THROUGH THE WOODS

Denali Outdoor Products was quick to get rolling when it landed a big contract with the organizers of the Maine Xtreme Hiking Challenge to supply each participating athlete with a newly redesigned EveryPath safety companion. Contestants would be walking billboards of the device's medical monitor, mileage tracker, GPS locator, and patented HelpAid safety beacon with automatic 911 calling trigger as they hiked, rafted, climbed, and camped their way nearly 400 miles from Kittery to the Acadian Landing Site monument in Madawaska. But getting the job also meant that the EveryPath model redesign project had to be completed months ahead of schedule, and initial results were discouraging.

The basic project was to add special sensors and communications to the current GPS tracker model and, at the same time, extend the battery life from about 6 hours to a minimum of 7 days. Denali would replace the present energy-hogging circuitry with newly released low-power memory and processors. The project, however, was turning out to be more difficult than anyone thought it would be, so the vice president of engineering and operations turned the redesign over to his top-gun electrical engineer, but not without a bit of foreboding.

Fast and ingenious, Denali's best electrical engineer was also a loose cannon. He was easily bored by and more than a bit lax about the more tedious aspects of his job such as documenting what he was doing and communicating with co-workers. But Denali had just 10 weeks until the event, so the company knew that the only way it could get the EveryPath redesigned and 200 units built in China and delivered to the gates of old Fort McClary in Kittery was by having the top-gun electrical engineer do his magic virtually overnight. He came through: The batteries remained charged beyond specs. He even, for once, updated the Excel spreadsheet that Denali used for its bill of materials (BOM) on a shared network server. Things were looking good at Denali.

Good, that is, until everything fell apart.

With less than two months to go before delivery of the product, the lead manufacturing engineer received an e-mail from the CM in China saying that he could not build the new EveryPath because the low-power processor didn't fit into the circuit board. Further, the CM reported that the processor on the BOM that his purchasing agent had received from the purchasing manager at Denali did not match the processor on the BOM the manufacturing engineer at the CM had received from Denali's manufacturing engineer.

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Since there had not been enough time to test alternative processors, the CM in China was instructed to call around to see if the processors were available locally while Denali's purchasing manager searched for chips in the US. The report back from the CM was that the right chips in China were on an 8- to 10-week back order. That was better than the 12-week lead-time in the US, but still beyond the 8-week window to deliver 200 units of the EveryPath in time for the Maine Xtreme Hiking Challenge. Denali would not be able to meet its contractual obligations.

At a post crisis meeting, it was discovered that the CM's purchasing manager, worried about completing the order in time, had contacted Denali's purchasing manager seeking a copy of the EveryPath's BOM so that he could start ordering long lead-time parts, such as the low-power processor. What Denali's purchasing manager did not know was that what he thought was the master BOM on his computer actually was an earlier design revision that listed a rejected processor. The electrical engineer had updated the master BOM on the server with the approved processor, but he had neglected to send an email to the purchasing manager notifying him of the revised processor selection. Having heard nothing about any changes, the purchasing manager assumed he had the latest revision.

Denali's investigation into the disaster determined that its processes had three main points of failure:

1. Too many BOMs in too many locations

From electrical engineering to manufacturing and purchasing on out to its CMs, Denali had multiple BOMs floating about on servers, desktops, and in email causing confusion as to which one represented the most up to date revision.

2. No process for change notifications existed

Changes to the EveryPath's design went unnoticed and were not formally communicated to the right people.

3. Communication channels with the CM were unclear

Both the purchasing manager and manufacturing engineer at Denali emailed BOMs to the CM. This lack of clarity over who communicated the master BOM caused confusion at the CM that led to the wrong processor being ordered.

As tempting as it might be to place the entire blame for the missed introduction of the new EveryPath, as well as the expense of the returned parts, on the purchasing managers at Denali and the CM, they were just the most obvious symptoms of a larger systematic failure at Denali Outdoor Products. Too many BOMs in too many locations, informal revision control, and unclear communications internally and externally practically pre-ordained the confusion that resulted in Denali's manufacturing disaster.

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HOW ARENA HELPS YOU MANAGE REVISIONS

Companies such as Denali Outdoor Products that rely on shared network servers to maintain their BOMs are on the right track by recognizing that a single location for their BOM is the foundation of a successful revision control strategy. However, by creating a process that is dependant upon error-prone humans at every step, they risk and often reap disaster.

Denali's process made it too easy for its purchasing manager to have a copy of the BOM on his local desktop. Consequently, even though Denali's electrical engineer had updated the master BOM with a new low-power processor that was the key to the redesigned EveryPath, the purchasing manager had failed to check for revised information. Convinced that he had the latest revision of the BOM in his possession, the purchasing manager sent it off to the CM, inadvertently setting off a series of events that led to disaster.

Arena eliminates this problem by enabling a controlled revision strategy. Arena provides a single centralized repository for product data that is web-accessible at any time to any employee, partner or supplier you authorize. All departments funnel their data to one location, so every user has access to everyone's contributions to your project.

Arena also tracks changes and impending changes automatically. Once a change has been approved by decision makers, Arena incorporates it into a new revision of your BOM instantly. This, in turn, means that your data is always up to date as well as available to everyone. For a company such as Denali, this would have meant that its purchasing manager and the CM's purchasing manager would have known the status of the low-power processor – approved or under review – and would have easily avoided ordering the incorrect component.

The screenshot shows the Arena software interface for a product named "BlueFin Remote NTSC / PAL Monitor". The interface includes a navigation bar with options like "Dashboard", "AUI Items", "Requests", "Changes", "Suppliers", "Supplier Items", "Files", and "Reports". Below the navigation bar is a search filter section with dropdown menus for "Items", "All Items", "where", "Phase", and "is". The main content area displays the item details, including the item name, revision status ("Working Revision *"), and various action buttons like "Save to Dashboard", "Export Item", "Browse BOM", "Add to Request", "Duplicate Item", and "Email a Link". A table of components is shown below, with columns for Item Number, Item Name, Phase, and Quantity. The table highlights changes between revisions, such as added components (indicated by a plus sign) and removed components (indicated by a minus sign). Callouts point to these changes, highlighting "See removed components", "See added components", and "Easily see quantity changes".

#	Item Number	Item Name	Phase	Quantity
1	2A0-0012-A1	Electrical Tape 3/4 x 66 Super 88	In Production	1 each
2	661-0336-A 661-0337-A	Minnow 2.5-Monitor-Shade BlueFin Remote Bulkhead	In Production	1 each
3	680-0076-A 680-0077-A	BlueFin Remote Bulkhead Assy PCA	In Production	1 each
4	705-0077-A	Double Ball Arm Clamp	In Production	1 each
5	705-0091-A	Allen L Key 3/32 in	In Production	1 each
6	780-0048-A	Box Tube - 7 x 7 x 10 (single tube box)	In Production	± 2 each
7	823-0314-A 823-0315-A	Thurston Remote NTSC Monitor Assy	In Production	1 each
8	823-0352-A 823-0353-A	Remote Monitor Charger Assy	In Production	1 each
9	825-0080-A	QuikConnect Ball End Assy	In Production	2 each
10	905-0108-C	Compact and Remote Monitor Instructions	In Production	1 each
	680-0124-A	Double 3-pin-male-Micro-SubConn-25.5-long	In-Production	± each

Redline BOM view in Arena - Compares 2 revisions and displays components that have been added or subtracted, quantities, phases, part names and part numbers which have been modified. Changes in files can also be shown.

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HOW ARENA HELPS YOU MANAGE CHANGE NOTIFICATION

While controlling revisions to its BOMs would have helped Denali avoid its disaster, the company's process still left it vulnerable to approved changes going unnoticed or left unimplemented as well as vital details on impending changes being missed by affected stakeholders. Arena eliminates this possibility by providing a robust change notification methodology as a standard component of its revision control system.

Arena's automatic notification system establishes a clear communication channel and an automatic process for delivering information on changes to all key members of your team and supply chain partners. Denali's purchasing manager would have been automatically notified when the electrical engineer's new revision of the BOM was available rather than assuming no changes had been made.

Arena offers layers of protection against ordering the wrong part or making a decision based on out of date data. You can impose varying levels of control depending upon where in the process your work is. During early design stages engineers can control the revisions and others can be notified when a new revision is available and ready for prototyping.

For Denali, the benefits of this process would have been two-fold. First, its purchasing manager would have been in the change notification loop, so he would have known the progress of the electrical engineer's work on a new processor for the EveryPath. Secondly, his communications with the CM's purchasing manager would have clearly indicated the status of the new processor, saving everyone time, effort, and money.

When going into production a more formal engineering change order (ECO) process can be used to get cross-departmental sign-off and approval. Arena prompts the review board to take action on the ECO and tracks the responses. All responses are then part of an auditable record in your permanent project file.

Standardized notifications establish a clear communication channel



Everyone reviews the same information and sees the same product changes

Arena e-mail notification - Easily keep internal and external stakeholders in the change notification loop.

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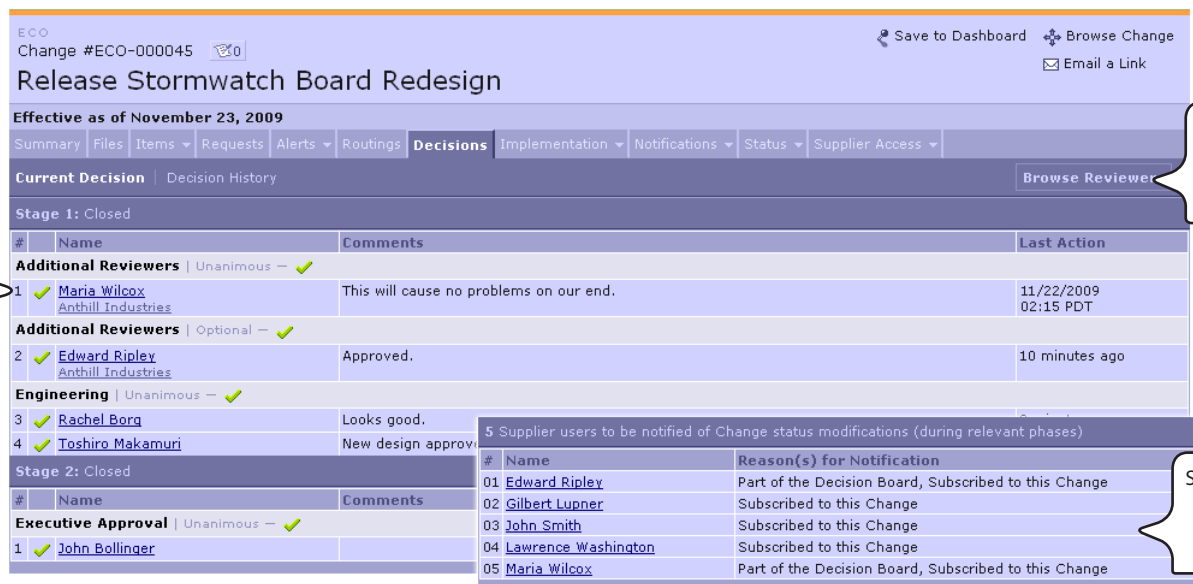
Once changes have been approved, not only does Arena notify participants of an ECO's status, it updates your master BOM and highlights the change so that stakeholders always have access to and know where to find the latest approved product data. For a company such as Denali this would have meant that its purchasing manager and the CM's purchasing manager would have seen the electrical engineer's change, which would have completely avoided Denali's manufacturing disaster.

HOW ARENA HELPS YOU COMMUNICATE CLEARLY WITH SUPPLIERS AND CMS

That Denali's purchasing manger and manufacturing engineer sent conflicting copies of the BOM to their CM only added confusion to the collapse of the EveryPath's manufacturing process. Arena eliminates such muddled communications by creating a single communication channel between you and your staff as well as between you and your CMs and supply chain partners.

Arena provides a single point of entry into your data so that anyone in any department in your company and any access-approved third parties, such as your CMs, knows where the latest information on your product resides. Even for Denali with two people communicating with two counterparts at the CM, the correct data, rather than conflicting data, would have been provided to the CM.

Since Arena also allows you to incorporate your CMs and supply chain partners into your automatic change notifications, you know that they will always be working with your latest revisions. You can even include them in your change review boards and prompt them for sign-offs. Further, they can use Arena to inform you that your changes have been implemented and provide the requisite documentation to prove it.



The screenshot shows the Arena software interface for a change review board. The title is "Release Stormwatch Board Redesign" and it is effective as of November 23, 2009. The interface includes tabs for Summary, Files, Items, Requests, Alerts, Routings, Decisions, Implementation, Notifications, Status, and Supplier Access. The "Decisions" tab is active, showing a "Current Decision" section with a "Browse Reviewer" button. Below this, there are three stages of review: "Stage 1: Closed", "Engineering", and "Stage 2: Closed". Each stage has a table of reviewers with columns for Name, Comments, and Last Action. The "Engineering" stage has a table of "Supplier users to be notified of Change status modifications" with columns for Name and Reason(s) for Notification. Callouts highlight key features: "Include suppliers on the change review board" points to the reviewer list; "Quickly add additional stakeholders to notifications" points to the "Browse Reviewer" button; and "Suppliers can be notified when the change is approved" points to the notification table.

Change view in Arena - Include internal and external partners in your change notification process, subscribe them to be notified of a change and/or as part of the decision board.

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ARENA HELPS YOU CONTROL YOUR REVISIONS AND STANDARDIZE YOUR COMMUNICATIONS

When Denali Outdoor Products took on the contract with the organizers of the Maine Xtreme Hiking Challenge, it was confident that it had the know-how to make good on its word. But no matter how quickly they were able to meet the design and engineering challenges of the contract, their error-prone revision process and disorganized communications channels were not up to the strain of a quick roll-out of a redesigned product.

With Arena, you can standardize and control your BOMs and ensure that the details of vital product changes among your staff, contract manufacturers, and other supply chain partners are clearly and consistently communicated to the right people at the right time.

A company like Denali may have thought it was too small to afford, set up, and maintain a collaborative bill of materials and change management system like Arena. The IT resources, software costs, and licensing fees of a software ownership model can be quite intimidating. But Arena eliminates those concerns by delivering software as a service, making it easy and affordable for small to mid-size companies to get control of their data, BOMs, and engineering and manufacturing communications.

Arena's flexible user-based pricing and on-demand delivery make the time and money hurdle of traditional software ownership a thing of the past. Arena delivers the software without requiring additional IT infrastructure and allows you and your team to focus on what you do best ... designing and building good products.

If your success depends on staying within budget and getting to market before your competitor, you cannot afford to let your data get out of your control. Arena reduces scrap, rework, missed deadlines, and cost overruns. Arena makes it easy to avoid disaster, stay on top of engineering and manufacturing changes, and control your bill of materials.

Learn more about how Arena can help you get your data under control by visiting www.arenasolutions.com/revisioncontrol

This whitepaper is brought to you by Arena Solutions, which enables small to mid-sized global manufacturers to deliver their products to market on time, within budget and at high quality. Arena provides a collaborative environment for centralizing, controlling and analyzing complex and constantly changing product information, including bills of materials (BOMs), part specifications and engineering change orders (ECOs).

The repository for the product record, Arena sits at the epicenter of the broader product lifecycle management (PLM) landscape, connecting with systems like CAD, EDA, PDM and ERP and linking organizations with their supply chains. With its on-demand, software-as-a-service (SaaS) approach, Arena is a low-risk, rapid-return proposition that makes enterprise-class functionality available to companies that would otherwise have to contend with manual, time-consuming and error-prone product data management processes.

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