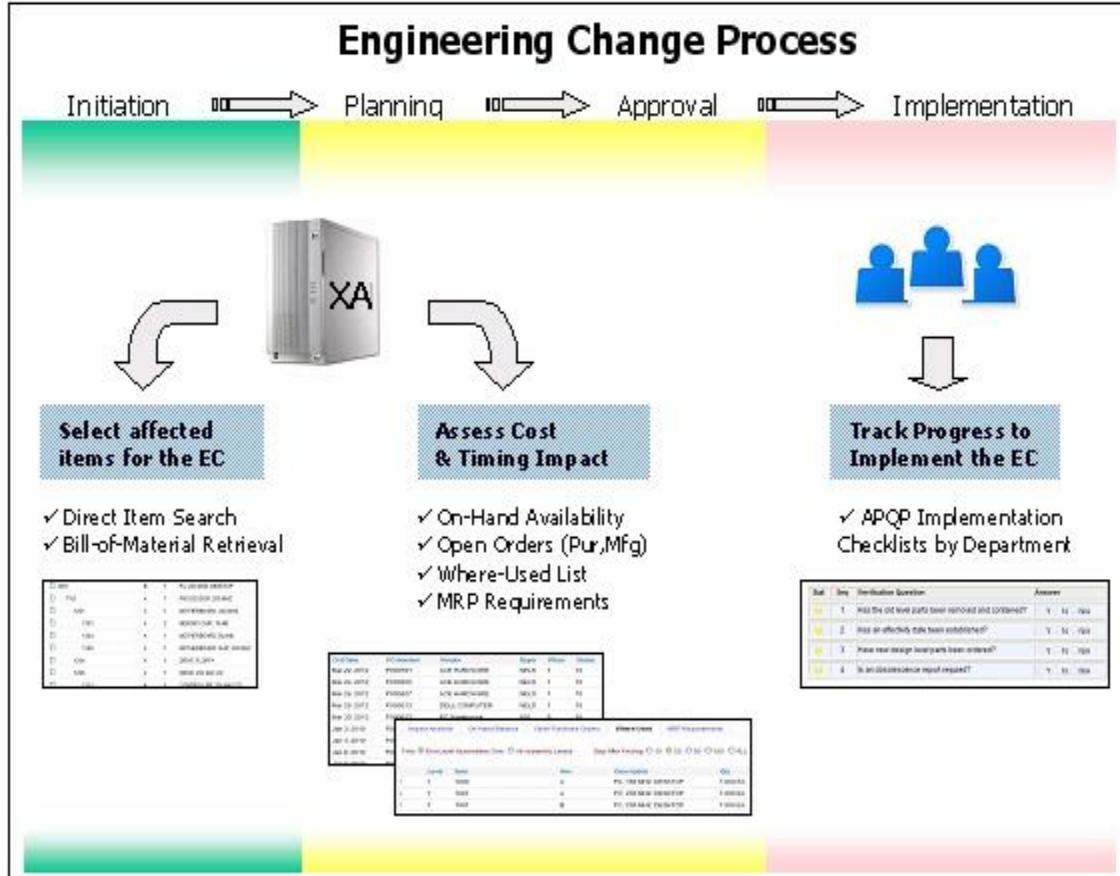# Engineering Change Management for XA

General Overview

The problem: How do you quickly and simply:

- See the *impact* of a change on PO's, MO's, on-hand inventory, or planning data?
- Know which changes will be ON TIME or LATE?
- Determine the exact status of a change? (Where is it in the process?)
- Maintain effective cost control of changes?
- Have one web "portal" that keeps track of all documents, tasks, approvals, workflows, processes, and people related to a change?

Change Management for XA is the answer. This is a web-based application to simplify, facilitate, and shorten the process of creating and managing ECs. It helps to lower costs by streamlining EC management and providing "impact analysis" to see the effect of a change on your XA system BEFORE the actual change occurs.

Benefits: Problems That Are Solved

- **Status tracking** of Engineering Changes is quick and easy from ONE portal
- **Cost Management** of changes
- **TASK MANAGEMENT**: automated workflows, approvals, and notifications for every step in the EC process
- **XA Impact Analysis** to see the how a change will affect your XA system:
  - Purchase Orders
  - Manufacturing Orders
  - Inventory
  - Planning Data
- Ability to know who is working on what … and when a task is due
- Knowledge of any EC that will be late or over budget
- Time Management—how long did an EC take? Why was it with Joe for three days? How long did it take to complete a change?
- Backup assignments to automatically move tasks to another person if they sit for more than a specified amount of time.

The system provides users with a flexible yet formal way to get tasks completed quickly, get information circulated, and get changes communicated and approved.   Users can quickly access all ECs and tasks, see the status of each, and get all the necessary information from a single web portal.

Key Features of the System

Some of the unique design aspects of the EC Management System come from the "process management" approach found in MKA's EC Management. More than just workflow, "Business Process Automation" is built into the system to:

- Manage information throughout an AUTOMATED PROCESS.
- Have access to all related information from a SINGLE PORTAL.
- See how changes IMPACT XA.
- Show the status of every EC at all times.
- Trigger action (provide conditional routing of information).
- Seamlessly route documents and information to users, even backup personnel.
- Ensure there is follow-up on an EC or Open Issue.
- Ensure that everyone who needs information gets it—at the right time.
- Manage and measure the TIME it takes to act on a document, or EC.
- Establish, coordinate, and manage priorities or "lateness."
- See the workload an each user.
- Automatically keep management "aware" without generating more paper.
- Create simple or complex workflows that provide structure and flexibility.
- Provide visibility and accountability to EC's, Open Issues, e-mails and related files.
- Reduce or eliminate "islands of information" (standalone spreadsheets, databases, etc.).
- Create, capture, and use documented, repeatable processes.
- Seamlessly integrate information from multiple systems or databases.
- Integrate people within AND outside your enterprise.
- Use CHECKLISTS and OPEN ISSUES.
- See a complete audit trail and history of all actions.

How It Works and What It Does For You

The system is implemented based on the users, workflows, "rules," notifications, forms, approvals, data needs, and specific processes <u>in your company</u>.
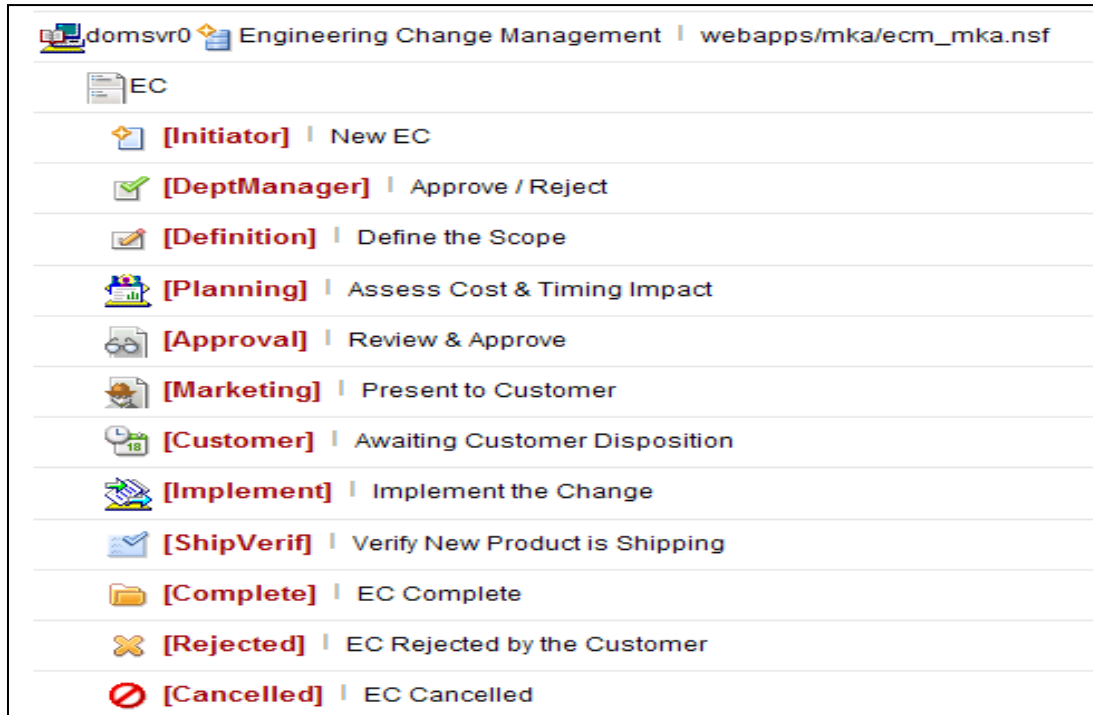
It is a system that is used to capture the specific information and processes that you need. The process is developed around the way information <u>should</u> move in your company related to all ECs and their impacts on XA. Different situations can have different "rules" or processes. The system incorporates your forms and data while leveraging your processes and/or rules. Data elements can be table-driven or captured from other places in your network. Training is easy. You are able to:

- use XA information

- eliminate unnecessary steps

- integrate users and tasks

- speed-up processes

A process is established by defining an activity and by indicating "previous" and "next" activities. Each step receives its own graphic icon to help make tracking EC's easy. Each workflow step correlates to an application "Role." Individuals are linked to a Role based on the e-mail Address Book.

All information is accessible electronically, including documents, e-mails, and files.

The following pages show more details of how the system works and what it provides for the users.

Visibility

Easy-to-use view lists and forms present the information in an organized manner and allow initiation, approval, review, update, and release of engineering changes.

The views can be created using any data element in the Engineering Change so that critical information is instantly highlighted.

- Where is it… who's working on it right now?

- What is the status?

- What are we working on for a specific customer or program/project?

- What parts have pending Engineering Changes and what is the effectivity?

- What will be the impact to XA?

Content and Navigation

This view of the application shows all Changes **By Customer** for the **Chrysler D2/DJ** program. Users have many options available to help them quickly and efficiently find the EC of their choice. In addition, the ECM System provides both an EC Search and full text Search option. The EC Search option allows the user to type in the first few characters of an EC number and then select from a list of matches. The full text Search option allows a user to key in any text to be found anywhere in an EC. The System will return a list of EC documents that contain the entered search string.

Color codes in the views indicate the timing of each EC relative to their due dates – whether they are on schedule to meet an internal due date, or in the cases of customer initiated requests, whether they are on schedule to meet a customer due date.

Forms—Tailored to Your Needs

To manage all of the data necessary to create and implement an engineering change, organization is required. The example below uses a form designed for a typical manufacturing company to provide a structure for managing information.

Each field is secured by user and workflow step. Options within this example include separate tabs to spell out all the affected part numbers, assess the impact cost, manage the Implementation Checklists, track Open Issues, list all Related Files, collect relevant E-Mail and document the EC status. Everything related to this document is stored in one place to provide a centralized record of an Engineering Change.

Selecting affected parts directly from XA ensures accuracy and affords users the convenience of not having to go to XA to investigate a change.

These types of forms are relatively easy to modify based on your individual requirements. The data elements in the illustrations are not necessarily required for each implementation.

Examples follow.

This is an example of a **File Registration** form which is used to associate related files in a secured format.

Users can associate a file by either attaching it as a static image in the Registration form, or by opting to save the file path as a hyperlink to the file as it resides on a shared corporate network. Both options have advantages depending on the type of file being stored.

Users can opt to enable file Security if it contains sensitive information, such as costing from the Estimating department or quotes from suppliers.

Authorization to edit a registered file is restricted by default, but the initiator of the document can choose to allow authorized editors by selecting names in the appropriate field.

As a convenience, the initiating user may check the box to automatically notify a specified list of users that a new file has been associated to an EC and is now available for review.

Storing related files in secured Registration documents ensures that all relevant information is kept with the EC document and is available to approvers (and auditors) on demand by simply opening the EC itself.

The following example illustrates a dynamic **Open Issue** for an EC.

Issues facilitate the solicitation of information from users outside the normal workflow definition. These users may be internal, (specialty personnel) or external (suppliers or customers). Users external to the company can respond directly through a standard internet web browser. E-Mail notifications include a hyperlink to the document itself. When a user clicks the link, they will be prompted to log in with their username and password in order to access the document.

Application security prevents external users from seeing documents to which they are not authorized. Typically, external users only have access to see documents they have either created or to which they are assigned.

Options within the Issue include a rating for Severity and categories by Department and Location. These fields provide the ability to sort and report Issues in convenient listings.

Expediting of Issues is performed by the workflow engine based on the Due Date selected. Expediting options may include a reminder message to the assigned user, or full document reassignment to a backup user.

Issues play an integral role in managing Engineering Changes and storing them with the EC is an effective way to keep all related information together.

Integration with XA

One of the most significant advantages of this solution is the ability to pull information from other databases in the network and work with XA. Action can be taken and decisions can be made instantly, with all supporting data necessary within a simple, easy-to-use web page. This links together the "silos" or "islands" that exist in many Information System environments.

The EC Management solution leverages XA data for affected parts by providing direct search capability for parts and assemblies. Affected parts can even be selected from the full indented bill-of-material.

Effectivity and Impact Analysis

Although some Engineering Changes must be implemented as soon as possible, establishing the most appropriate **Effectivity Date** for an Engineering Change can be a critical event in minimizing the cost of the change. Based on the Inventory and Order (Customer Order or Replenishment Order) status, the wrong timing for a change could lead to excessive re-work, scrap, cancellation charges, large write-offs, or other avoidable costs.

The Engineering Change Management application provides ready access to critical XA information to establish the best date and to facilitate Inventory Disposition and Order Action activities.

Users have direct "live" access to item availability (On Hand, On Order), a chronological view of Supply and Demand (Customer Orders, Purchase Orders, Manufacturing Orders) and a choice of an indented Where-Used list or top level assembly Where-Used list.

PROCESS Management, integration, and the ability to MOVE INFORMATION and TRIGGER ACTION make EC Management with XA a time-saver with a high ROI. Inventory obsolescence can be greatly reduced.

Each EC is completed by tracking the progress of Implementation Checklists. Each department involved in the Change must respond to a series of questions in order to document the completion of their work. This documentation might also involve other PC files or paperwork. In fact, some questions will require a user to store the file as evidence for completing the work.

Checklist questions are internally maintained and can be updated anytime by an application administrator.

The view show below depicts a listing of **Open Issues By Assignee**. Issues sometimes arise during the processing of Engineering Changes and most companies simply maintain these in yet another spreadsheet file. With ECM, Issues are kept with the Change and can be managed in tandem with the same flexible expediting rules that are available to the EC itself. Keeping information together helps everyone involved to stay "on the same page" and work to accurate information.
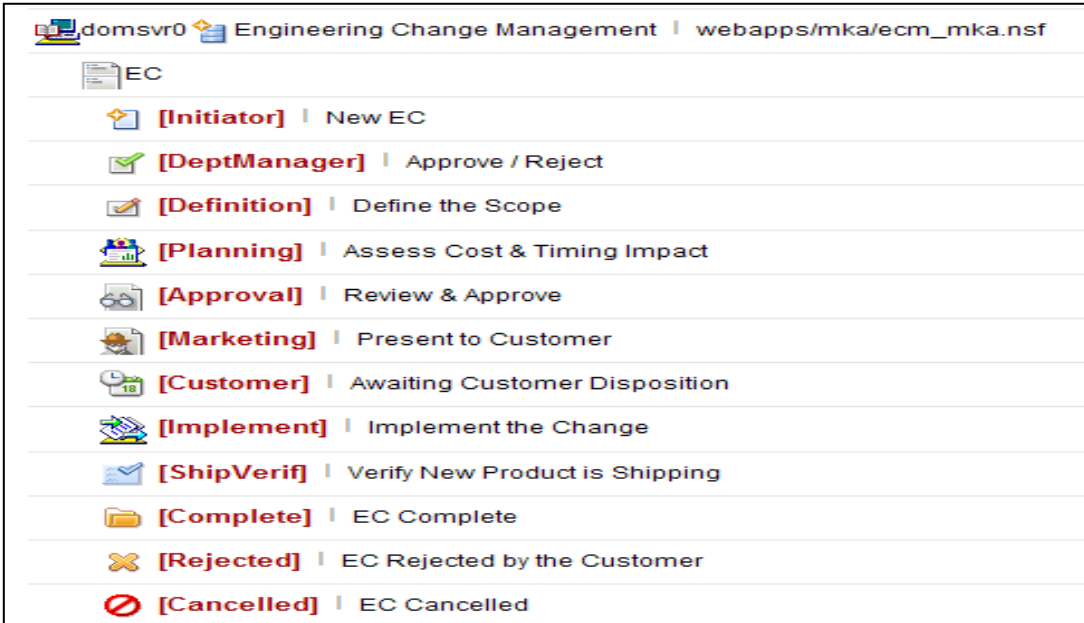
Defining Your "Process Flows"

Rapid, effective communication of information and automated processes are the keys to minimizing time and costs for engineering changes.

Process flows can be quickly and easily defined. These flows help to formalize your company's *standard engineering change process*, yet still allow for process variations and changes "on the fly."

The example below shows how a "process flow" can be defined:

A process is established by defining an activity and by indicating "previous" and "next" activities. Each step receives its own graphic icon to help make tracking EC's easy in a list. Each workflow step correlates to an application "Role." Individuals are linked to a Role based on the e-mail Address Book.

As workflow steps are completed, the Engineering Change document moves on to the next defined step in the process. When a user clicks the "Submit" button, the document is saved, updated with the reviewing user name and time stamp, and an e-mail notification is sent directly to the next assigned user in the process. E-mail templates defining the content of the notifications are established in each workflow definition document.

Some steps are always assigned to the same users, while other steps may route to different users depending on the content of the Change itself. Still other cases may allow for a user to select the next reviewer in a field directly on the form.

The robust flexibility of the workflow engine ensures that the ECM System can accommodate a wide array of review and approval algorithms while meeting stringent auditing standards.

Expediting/Backups is a critical feature to effectively manage documents through a process.

Each user in the System can be defined with their own backup and expediting rule for each workflow step in the process. Expediting rules can consist of a simple reminder e-mail notification, automatic document reassignment to a backup user or automatic bypass to the next reviewer.

Automatic document reassignment may occur if a document sits idle beyond the set time-limit for the current user/workflow step. Each workflow participant should have a backup user defined in the System. Backup users will be used when the primary user is unavailable or, in the case of expediting, when a document sits idle for too long.

Users may toggle their availability by simply clicking a **Status** link at the top of the application web page.
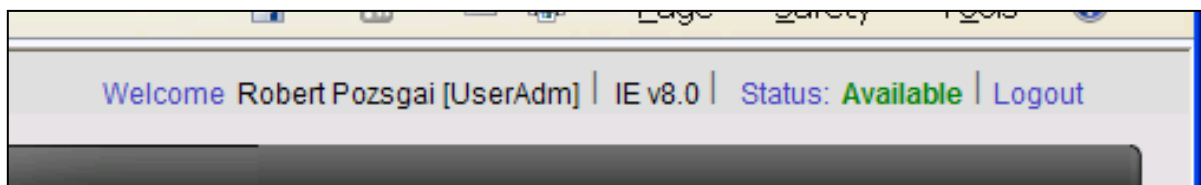
Summary

Easy-to-use view lists and forms present the information in an organized manner and allow initiation, approval, review, update, and release of every engineering change.

Engineering Change Management **links data, documents, people, processes, Infor XA, and other systems into a single "time-scheduled" system for managing changes. Information "moves" to the appropriate user and "triggers" them to take action within a certain timeframe.** Users don't have to go look for data or look for what to do next—it comes to them *as part of the process that you define*.

The Implementation Methodology

MKA uses a proven, successful, 1-2-3 step implementation methodology.

The Roadmap

MKA works with your company to create a "Roadmap" for improved EC Management. Many companies spend years struggling with how to best manage Engineering Changes. MKA has a process to ensure a company has an agreed upon vision and system definition that meets the final requirements and needs of the company. This is the result of the Roadmap process. This process defines and documents user requirements, system requirements, and a shared vision for EC Management.

The Roadmap process culminates with the **Final Review Signoff Agreement**. This Agreement serves as the definition of a company's objectives, priorities, processes, flows, data requirements, and other details about how an Engineering Change Management System should work. The Agreement is the agreed upon and documented **vision** and **project scope** for the company.

The Final Review/Signoff Agreement will reflect your needs and how the system will work. The Agreement is based on the team's input of how a system should work. The Agreement is the critical first step (Phase 1) in the implementation.

At the conclusion of the Roadmap, the Executive Sponsor, Project Leaders, and key users agree to and sign-off on the details of a System. Thus, the Agreement serves as the AGREED UPON system/project vision and scope.

The Final Review Agreement is used as the system and project definition. It is the critical deliverable of Phase 1. MKA's overall implementation methodology includes:

- Phase 1: Roadmap Process resulting with the Final Review/Signoff Agreement

- Phase 2: Implementation Setup, Training, and Prototyping (as needed and defined in the Final Review Signoff Agreement)

- Phase 3: Pilot and Final Testing

Summary

Most companies do not have the time or experience to define and document a good Roadmap of their real needs and how a system SHOULD work for the company to more effectively manage engineering changes. MKA has the expertise, background, and experience to create a Roadmap with your team. The "Roadmap" provides a documented vision of how the company will utilize an automated process to streamline EC Management.

More About the Roadmap Process

The main topics covered in the Roadmap include dozens of things, such as:

- Key Objectives for the system
- Users and their roles
- Workflow/process steps and approvals
- Data needs (from where? to whom? When?)
- Forms definitions
- Database access/integration and requirements, including source data needs
- Costing needs
- Measurements (How long does an EC take to process? What are the workloads? Etc.)
- The agents and triggers needed so that information "flows" to the right users at the right times using automatic notifications (based on defined conditions)
- e-mail requirements and how they are a part of the process
- Needed "Views" of EC's, Resources, Tasks, Priorities, Costs, …
- Other relevant aspects of Engineering Change Management and tracking
- The key systems and applications that need to integrate with the Engineering Change Management System (XA integration)

Some of the key features to streamline the EC Management process include:

- EC creation
- XA integration
- Status of (visibility to) all EC's and quick access to EC's in a variety of ways
- Electronic forms
- Automated Task management and workflows
- The ability to handle easy and complex changes
- Issues management (open tasks)
- E-mail and file/document integration to the specific EC
- Changes requests and change management
- Statistics about the "time" required to process an EC
- IMPACT ANALYSIS to see an EC's impact on XA
    - Purchasing
    - Manufacturing
    - Planning
    - Inventory
- Internal and Customer initiated changes and EC "types"

MKA Industry Experience

MKA has a highly skilled team of consultants, designers, and developers, with between 17 and 42 years of experience. We have extensive skills in Engineering Processes, Business Management, Information Systems, and over 30 years with XA. It takes experienced people to define, document, and perform the implementation and make sure the application works for you. Our customer success rate is VERY HIGH because of our tremendous experience, industry knowledge, and Process Definition skills that are part of the methodology.

The final result is a **full-service implementation and successful project.**