

SRA Systems, India

Automation of Assembly Line Operations using Business Process and Document Management Solutions

A Case Study

100, Valluvarkottam High Road ▪ Nungambakkam, Chennai – 600 034 ▪ India

Tel: 91- 44 – 4213 8656 / 2825 5519 ▪ Fax: 91 - 44 – 2825 6984 ▪

e-mail: corporate@srasys.com ▪ Visit us at <http://www.srasys.com/>

SRA provides Business Process and Document Management Solution to an Automobile Manufacturing company.

Background

The solution was offered to a leading brand worldwide in the premium car segment manufacturing company. The company had extended its business operations in India and has setup the manufacturing division at Chennai.

Key Objective

- ❖ To develop a browser based business process and document management system to automate processes across the assembly line.
- ❖ The project basically involved the following at a macro level
 1. Phase I comprises of development of Document Management System to manage and automate the distribution of documents (instruction manuals, process sheets, etc) to technical personals across each workstation
 2. Phase II comprises of automation of the assembly inspection card (Job Card) processing
- ❖ To centrally store, secure and distribute documents. This will enable technical personals in the assembly line access to the latest information.
- ❖ To provide access to information to users relevant to the workstation task.

The Challenges

There are various stages or steps involved in the assembly process of an automobile (vehicle) manufacturing before the vehicle is dispatched to the dealer. As an example, steps could involve fitting the engine into the car followed by installation of air condition system and so on. These steps happen at various areas termed as 'Station' or 'Workstation' in the assembly unit. There would potentially be "n" such stations that a car will pass through the assembly line before they are completed. At each such station there are operators to perform the required tasks.

A car body is accompanied by a Job card, which is identified by a VIN (Vehicle Identification No.). At each station, set of tasks is performed and the workstation personal acknowledges each task (fitting parts like driver air bag, music system, etc) after it is completed by putting a stamp against it.

Each car part is identified with a serial number. The bar code of the serial number is found in the relevant part and the person at the station basically generates the same in a sticker and applies it on the job at a particular place. The car, from any station in the line, can go offline. This means it will be pulled out in that station and kept elsewhere and will be

brought back to the same station once it is ready to be operated. This can happen if there are severe defects or non-availability of parts, etc. A defect history is been captured in a defects sheet, which is sent to the logistics department. The logistics department collects the parts from the stock room, goes to the specific station, delivers it and gets an acknowledgement from the station person that it has been delivered.

All these operations are highly critical, because failure or delay of any single activity may lead to temporary halt in the process and drastic loss in terms of time, cost and customer satisfaction.

It is preferable for operators in the assembly line to deal with information which is relevant to their responsibility rather than deal with a whole lot of them and trying hard to filter out all irrelevant information. Typically these operators deal with the following

1. Instruction manuals and information documents to help them perform their tasks well.
2. Job cards covering all aspects of car assembly.

As far as #1 above is concerned, since these manuals and documents vary based on the task carried out at each of the workstations, the access by the operators should be limited only to those as well as should not require elaborate operations of the computer.

As far as #2 above is concerned, the operator should be able to deal only with relevant portion of the job card rather than a whole lot of other details which are connected. This will enhance the reliability of the information that is filled up in the job card.

So an effective business process and document management system needs to be implemented, so that the relevant workstation related instruction is managed, processed and easily accessed by the workstation operator over the network via a touch screen kiosk.

Some of the other challenges the company was facing:

- ❖ Document security
- ❖ Document versioning and backlog conversion
- ❖ Document storage space
- ❖ Damage due to physical handling
- ❖ Increased cycle time

SRA's Approach

SRA studied the existing process and implemented Real-Time Dynamic Information System (RDIS), an intelligent business process and document management system in phased manner.

Phase I: Development of Document Management System to manage and automate the distribution of documents (instruction manuals, process sheets, etc) to technical personals across each workstation.

Phase I comprises of following features:

- ❖ Organizing documents containing information such as various stages or steps involved in the assembly process of an automobile (car) manufacturing before the car is dispatched to the dealer
- ❖ Large numbers of scanned paper documents and electronic documents (instruction manuals, job cards, etc) are imported, indexed and stored in the centralized repository for easy retrieval
- ❖ End-users use touch technology, which allows quick access to the documents as soon as it is created/updated
- ❖ Anytime and anywhere access via web browser over a network
- ❖ Administrator can broadcast important messages, information and alerts to all workstation personals and also update quality information and new product updates to each workstation personals through dynamic ticker message and screensaver mechanism
- ❖ Administrator can allocate the document to each workstation in just a matter of seconds through document allocation matrix
- ❖ Built-in report generator to view process performance, which can also be exported in PDF format
- ❖ Log files to have a track on uploaded document history, which includes document version, created and modified date, etc., for efficient document and process audit
- ❖ All documents are available on time to the assembly personnel regardless of their location
- ❖ Workstation personals will be automatically notified about any document as soon as it is created/updated
- ❖ Workstation managers/supervisors will be automatically notified about document expiry in order to take appropriate measures for further utilization

As soon as the phase I was completed and implemented, the company observed increase in productivity due to automated, easy and fast document distribution and retrieval system.

Phase II: Automation of processing the assembly inspection card (Job Card) and handling an operation that involves providing materials (car parts or accessories) to be supplied as needed.

Phase II comprises of following features:

- ❖ Optimizing processes involving various workstations using SRA's Business Process Management (BPM) expertise
- ❖ Workstation personal can update the job card of each car (identified by unique Vehicle Identification Number (VIN)) with the help of the touch screen kiosk once the part is

fitted. The bar code of the fitted part is entered in the job card with the help of the barcode scanner, which is integrated with RDIS application. Once the job card is updated, it is sent to next workstation personal

- ❖ The workstation personal has the option to enter the serial number of the fitted part if there is no barcode attached in the parts
- ❖ Task list in the Job Card relevant to the workstation is shown for the operator to check and mark.
- ❖ Defects identified in the parts are captured by selecting the predefined defect classification list or by entering the defect in the application.
- ❖ At the end of the assembly, all the captured information is stored in the RDIS application. The completed job card can be retrieved using the VIN for future reference
- ❖ Backup and recovery mechanism protects information from system hardware error or any cause of natural disaster and acts as a safeguard against unexpected data loss, by providing a way to restore original data

Quantitative changes in performance and affordability have led to qualitative changes in the process of distributing information. Most are embedded invisibly in RDIS application, making information and services safer, more secure, flexible, energy-efficient, and less expensive than ever before.

Benefits

- ❖ Browser based user-friendly interface
- ❖ Efficient and flexible document storage system
- ❖ Better process control
- ❖ Reduces cycle time
- ❖ Version control made easy
- ❖ Greater application availability and security
- ❖ Ease evaluation of business risks
- ❖ Easy-to-understand reporting
- ❖ Agile backup and recovery mechanism

Technologies Used

- ❖ PROOF – A BPM platform
- ❖ DIAL – A document management platform
- ❖ .Net framework 2.0
- ❖ Asp .Net with C#, JavaScript
- ❖ Ajax 1.0
- ❖ MS-SQL Server 2005