IPRO 320
Planning the Implementation of a New Enterprise Resource Planning Software Platform

Team Members:

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Introduction

The purpose of IPRO 320 was to improve processes and work flow for Arrow Gear by improving their use of Infor Visual Enterprise Resource Planning Software. At the end of the Spring 2007 semester, the work of this IPRO led to Arrow Gear operating more efficiently, and also allowed them to take on more customers, increase profit, and grow as a company.

Background

Arrow Gear is among the most technologically advanced gear manufacturers in the world. Its facilities in Downers Grove contain state-of-the-art technologies for full design, manufacturing, heat treatment and inspection of a wide variety of gear and gearbox products. Arrow Gear is particularly well-known for its extensive expertise in the production of spiral bevel gears, they are also heavily involved with spur and helical gearing, and the application of gearboxes for the aerospace industry. Arrow Gear's technologies for production not only allow them to manufacture a wide range of gears almost entirely in-house, but also to meet the requirements of the most demanding customers. With both commercial and military customers, Arrow has market segments in everything from printing presses and robotics to aircraft, helicopters, and rockets.

To manage and track the work, they are currently using Infor Visual ERP software, version 6.3.8. The software can track materials, inventory, employee labor, work orders, manufacturing processes, scheduling, quality assurance, and more. There are two parts to improving Arrow Gear's work flow. The IPRO team first investigated issues with the current version of software, as well as looked into upgrading to the latest software release, Visual 6.5.2. To investigate issues with the current software, the IPRO looked at multiple aspects. The team observed how Arrow Gear managed and tracked current work using Visual ERP and their own stand-alone systems, what the company does not like about the software, and qualities and functions that make the software inefficient. The team determined Arrow Gear's needs and desires with the software, and additional functionality that would improve the company's workflow.

Purpose

- Documenting current workflow and processes involved in gear manufacturing
- Detailing current redundancies and inefficiencies with Visual ERP 6.3.8
- Identifying improvements needed with Visual ERP
- Determining benefits of upgrading to Visual ERP 6.5.2
- Installing and configuring Visual ERP 6.5.2
- Documenting process issues that still need to be addressed after the install

Research Methodology

The professor acted as a guide to the team members. As an experienced consultant, he briefed the team on current manufacturing practices, as well as acted as the primary contact between the team and Arrow Gear. There was a plant visit almost every week to know and understand how exactly the company operated with the current system, and the professor accompanied the team on most of these visits. To aid to the team's understanding of the software, the company provided a tutorial for their current software, as well as four workstations at their plant to experiment with their software and future upgrade configurations.

The team was divided into subgroups and each subgroup selected one department to work on. Each subgroup met the concerned department head and collected the information on how the department worked. It was important to maintain impartiality and a high level of professionalism during these interviews so as to avoid any ethical concerns that may have arisen had the team not been so careful. This approach also helped us gain trust in the eyes of the department managers, which opened the avenues for communication and thus produced an environment where the managers would more freely describe the issues their departments were having.

After sharing findings with the entire team, the team met to generate new ideas to improve the efficiency of the department. The team met every week to discuss the progress of each subgroup as well as any problems they faced. Then the team would try to find the solution for the problem as a whole, using any available resources as well as information collected from each department.

The work and progress of the team, as well as information collected, was documented. It was formed into a presentation for the benefit of both Arrow Gear and the IPRO community.

Assignments

The team identified six separate areas of investigation within Arrow Gear and Visual ERP, listed below. For each category, subgroups of two students were formed. Within (though not restricted to) their respective categories, the students conducted interviews with employees, researched software functionality, and determined solutions.

- Customer Service – sales, work orders: Khoa Le, Manu Pushpanath
- Engineering – process and time standards: Rahul Tayal, Sourabh Sethi
- Manufacturing – scheduling and materials management: Adam Bain, Tony Carfang
- Manufacturing – inventory, labor, shipping, receiving: Sam Solomon, Hong Kim

- Quality Assurance – nonconformance, corrective actions: Tony Carfang, Joe Velten
- Software Interface – regarding user interaction to software: Sourabh Sethi, Adam Bain

Obstacles

In the beginning, only two members of the team had some knowledge of ERP. It was completely new for the rest of the team. It was a challenge to understand the system from scratch. Secondly, the new version of the software was only available at their plant. Thus, learning the new version of the software was a bit difficult for us because we had to drive there every time.

Results

The team identified over 30 specific issues that employees had with Infor Visual ERP as well as several issues the team discovered relating to the integration of multiple departments at Arrow Gear. After researching possible solutions, both through improvements provided via the newer version of Infor Visual ERP, and through a change to the training procedures, the team presented these issues and their solutions.

Some of the major issues include inefficient interfaces within Visual ERP, a lack of communication between modules of the software, a lack of logging events and changes, and no way for Arrow Gear to successfully estimate times for processes to accurately schedule jobs.

There are many complaints about the interface of Visual ERP. In order to see any significant amount of data needed about a gear, an employee must look at many different forms and windows within the software, which involves a lot of jumping around. Additionally, when searching for a work order and then a specific part within the work order (as well as many other situations), it is necessary for an employee to jump between windows to copy and paste information in order to accurately search for it or populate data fields. There are many additional interface issues that were complained from many company departments. The interfaces just don't seem very streamlined or intuitive, and that can easily lead to a slow down of the company's overall efficiency. Some of these are addressed in the new version of Visual ERP, while others still need solutions.

One big fault of Visual ERP 6.3.8 is the lack of communication between Manufacturing and Quality Assurance modules of the software. This poor communication exists because the Quality Assurance module was added later as an afterthought. It can cause many headaches and hassles. For example, when examining a work-order for a part, say a quantity of 100, suppose QA rejects 5 of them. Once rejected in Visual QA, the rejected parts in Manufacturing, should become invalid, but they aren't. So QA must manually check off the 95 good ones when going to the next phase, and when they bring

up the list of parts to select for the order, they have to go through the entire list of all of those parts (say 500 or more) and manually find the 95 good serial numbers for the work order and check them. What Arrow Gear would like the system to do is, first, automatically invalidate the 5 in the order and go to the next step automatically with the remaining good parts; and second, when searching from a specific work order for a parts list, it should only bring up the parts from the work order. As this issue currently causes a waste in time, it also leaves processes prone to error. As Infor was well aware of this lack of communication, this has been resolved with version 6.5.2.

With any good database, all changes are generally logged. When data is added, deleted or modified, preferences changed, or anything else involving the database, an entry is generally created in a log. Infor's Visual 6.3.8 does not contain any significant data history or logging system. Having one would allow for better recovery in case of accidental data modification, or track better how tasks are assigned to other employees, and much more.

Schedule estimates are currently the largest of problems; shipping orders late has almost become the standard at Arrow Gear. Currently, there is no module or process for tracking metrics. This means that Arrow Gear does not track how long any individual process takes. Schedule estimates are relatively random at the moment, and also very incorrect. Some sort of metrics tracking mechanism within Visual would be a fantastic way for Arrow Gear to get a handle on schedule estimations, leading to shipping orders on time.

These problems were addressed by the specific solutions listed below. By implementing these solutions, and through efficient use of the upgraded ERP system, internal communications of the company were improved, and delays with job processing and work orders were reduced.

- The Quality Assurance Module was better integrated with the Manufacturing and Accounting Modules, as well as the rest of the current system.
- Security measures within the database system were improved through access controls.
- Better support for full activity logging and transaction history.
- General activities became streamlined through better interfaces within the ERP system.
- The team determined which problems were solved by upgrading the Visual ERP.
- The team came up with possible actions to resolve the remaining issues, both through added functionality from Infor Visual and from modifying some of Arrow Gear's internal processes.

Next Steps

One of the largest areas of improvement that the team identified was improving the time estimates for work orders. Currently, the issue is that one individual within the company is relied upon to use his experience and judgment for the time estimates. This leads to issues when parts get delayed due to unforeseen requirements that come up.

The Infor Visual ERP system does have the capacity to help in this regard, as it does have a Scheduling module. Additionally, Arrow Gear tracks the time that operations take by having the floor employees scan into the system before and after an operation.

Therefore, it is recommended that any future teams on this project attempt to tackle this particular issue, since based on the current team's observation, finding and implementing a solution would be a great benefit to Arrow Gear.