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"Implementing A Product Data Management System: Catalyst For Continuous Change In The Engineering Function"

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AAM acquired five plants from General Motors in March 1994 and created a new senior management infrastructure to run the new company. The company's CEO is Richard E. Dow who once ran plants for Chevrolet and Volkswagen. GM was concentrating on car and truck assembly, and was not putting money into components, so they looked for investors who would take over their axle business and recapitalize it by buying new technology, machines. The initial investors needed more capital, so Flagstone Investors bought out these investors after three years. AAM went public two years ago.

The company has since grown from five plants in Michigan and New York to twenty-one plants in six countries and four continents. The latest acquisition is in Brazil, but AAM also has made acquisitions in Japan, Germany, and the UK. These acquisitions have expanded AAM's product line from the lower end of the axle business for passenger cars and light trucks to medium and heavy duty trucks. Revenue has grown from \$1.8 billion to \$3 billion. GM was initially 99.9% of sales. This has been reduced to 72%

AAM manufactures drive line systems, chassis components, forged products and services, steering linkages, propeller shafts, rear and front axles, and stabilizer bars. Their market share of forged products (30%) is the largest in the U.S. Associates have helped to eliminate waste and inefficiencies. AAM started with 7,500 associates. Some preferred to remain with GM and were transferred to GM plants when the original five plants were purchased. There are 12,000 associates today. Total manufacturing capacity has grown from 9,000 axles per day to 18,000. They have a plant in Mexico that has cheap labor, but some work is now coming back to the US.

One of earliest IT challenges was to purchase a PDM system to help reduce product development cycle time. Most of the existing IT infrastructure was inherited from GM, which relied heavily on EDS for design and implementation. AAM needed to integrate all of these administrative systems with engineering. All are integrated now.

Bob prefers to buy off-the-shelf products whenever possible, but wanted the users to select the product they would work with. He put together a multi-disciplinary team. The team looked at three hundred products, but narrowed that to 28 ERP systems for further analysis. These systems varied between mainframe, PC, client-server based technology. EDS and the AAM user community worked offsite.

A team also selected the PDM system. The selection criteria included "best in breed", commonality, functionality, market prominence, client-server technology, security, and demonstrated product performance. It needed to handle all product information, drawings, memos, change management, mark-up, electronic blueprint vaulting, CAD.

Bob was concerned that the team look at all PDM products, not just those associated with EDS, such as IMAN. AAM inherited its relationship with EDS from GM. Potential bidders would not submit bids if the committee were perceived as biased toward EDS. The team members that were eventually selected were required to go to software shows and look at all PDM products. The

selection criteria included minimal customization, vanilla product, quick training, capability for add-ons, can be implemented in small steps.

Engineers were easy to train on the new systems, in part because they picked the product. People in the plant were toughest to train. The product was off-the-shelf, but the process had to be designed. Conversion of data from paper to an electronic medium was one of the toughest jobs.

Benefits: The PDM system cut cycle time by 30% in nine months (1996-97) for small and big products. Errors were minimized, e.g., used to put data in BOM at engineering, and then again at manufacturing. Duplication and transcription leads to mistakes. Engineering and manufacturing now look at the same current drawings. Engineering changes were reduced by 70% which led to a \$1.2 million cost reduction. Filing and retrieval from drawers were eliminated. This saved \$120,000. Also eliminated was sending multiple mark-ups to the shop-floor and back again. This saved \$500,000.

AAM's first efforts at supplier collaboration began with the companies that it had acquired; three plants in the UK, three in Ohio, and three in Michigan. This would give them the experience to eventually work with outside suppliers. Although each plant had different ERP/PDM technologies, they were linked through a common portal. After firewalls were put into place, they began to hold on-line sessions. The strategy was to tweak or modify the process online and eventually to add strategic partners to the network. Their plan is to have 72% strategically critical partners online in the next two years. They are currently at 34%.

One challenge for collaborative design with suppliers is data ownership. Who owns the data? Suppliers need to share the data, e.g., Delphi makes brakes that are integrated with AAM axles. Another challenge involves culture. Bob hired an anthropologist from Wayne State University, to help identify common cultural issues across AAM's US plants. The finding was that the culture of each plant studied was different. AAM decided to introduce new technology first in Three Rivers, Michigan, and then in Detroit, and Tonawanda, New York.

Bob cited AAM's recent success in gaining new business from DaimlerChrysler. One of AAM's biggest competitors is Dana Corporation. Dana had problems with an axle that they were producing for DCX. Dana had changes in progress. AAM asked DCX if they could offer an alternative axle. The challenge was that DCX wanted the new axle in 53 days, and they used Catia for design, while AAM used Unigraphics. AAM had some engineers who knew CATIA so they bought CATIA work stations and converted their existing data for use with CATIA. They also had to send data to suppliers that made their axle components. They completed the work in 53 days and won the business from DCX. They also have won new DCX axle business for the Jeep Cherokee.

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Last modified Sunday, 07-Oct-2001 21:52:40 EDT