

DFA/DFM Gets Off The Ground at McDonnell Douglas

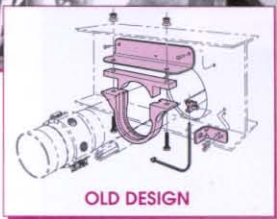
McDonnell Douglas/Douglas Commercial Aircraft discovered the significant impact that DFA/DFM can have on even low-volume parts through two pilot projects to redesign existing aircraft components.

Testing what DFA/DFM could do on a simple assembly, a Douglas Aircraft team decided to redesign a waste pipe/wire harness bracket with help from Munro & Associates.

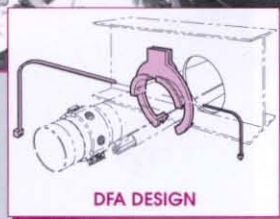
Before implementing DFA/DFM, each MD-90 airliner produced by Douglas Aircraft had 50 waste pipe/wire harness brackets that cost the aircraft maker \$64.01 each. This contributed \$3,200 to the overall cost of the aircraft.

After just two weeks, the team found that through DFA/DFM techniques **almost 94 percent of the cost per part could be eliminated**, saving the company approximately \$3,000 per airliner.

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OLD DESIGN



DFA DESIGN

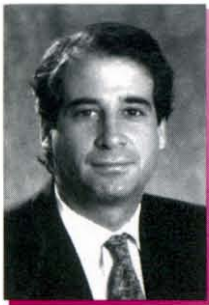
*A Message from
Sandy
Munro*



Tools — especially the computer — have had a profound effect on our lives. And with more powerful hardware and software being introduced each day, it's easy to jump on the technological bandwagon. But depending on a computer to solve our problems is like starting up a chainsaw, throwing it into the woods and expecting finished 2x4s to come out. Tools are important, but they are only tools. **People with ideas** make the difference.

As John F. Kennedy once said, "Man is still the most extraordinary computer of all." Nothing can replace the genuine skill, creativity and experience of a tried-and-true professional. That's why we've added several associates to our team who have vast experience in DFA/DFM, the **Munro Quality Report Card** and **Assembly Ergonomics**, to our team. See page 3 for more information on our new additions.

DFA/DFM As a Growth Strategy



While some manufacturers use DFA/DFM to cut costs, Fountainhead Technologies Inc. actually used it to build a successful company. In fact, the strategic use of DFA/DFM helped this start-up company pull itself up by the bootstraps and increase sales from \$20,000 to \$6.5 million in just three years.

The Providence, R.I.-based company, a manufacturer and marketer of swimming pool sanitation systems, began marketing products in 1991 as a small, bootstrap operation. With few resources and limited exposure to DFA/DFM, Fountainhead generated only \$20,000 in annual sales from its "SwimFree" ionization unit—which had 80 parts and retailed for about \$1,000.

In 1993, Fountainhead President and CEO Frank Lubrano and his team began working with us to help cut costs in order to increase sales. By initially focusing on a redesign of the sanitizer's replaceable cartridge, we eliminated **76 percent** of the parts, slashed manufacturing costs by **70 percent** and cut the retail price by **40 percent**. More importantly, the company's annual sales jumped to \$600,000.

With such dramatic improvement, Fountainhead could have considered this a success. But we knew we were only scratching the surface ... and laying the foundation for the ultimate redesign.

"The Strategic use of DFA/DFM helped this start-up company pull itself up by the bootstraps and increase sales from \$20,000 to \$6.5 million in just three years."

Working with limited time and budget, Fountainhead's team implemented medium-risk changes on the next model which was nicknamed the *Blue Bullet*. By changing the product's configuration and using off-the-shelf technology, we cut the redesigned product's retail price to \$200. Again, sales skyrocketed as nearly 12,000 units were sold in the first year. Company revenues in '94 grew to \$3 million.

Each redesign provided Fountainhead with increased profits and resources, which in turn allowed us to move



Innovative "Seasonal Disposable Unit"

toward stretch goals for the next generation product. For 1995, through a truly innovative design, the Fountainhead team developed the all-new seasonal disposable unit.

This new unit cost **80 percent** less to manufacture, has no moving parts, is simple to install and retails for only \$79 — **90 percent** less than the original unit — making Fountainhead's unique purification technology more affordable for the mass market. Annual sales more than doubled between '94 and '95 to \$6.5 million, and the outlook for '96 is strong.

Fountainhead's success proves again that **creative product design can do more than provide competitive advantage** — it can be a **crucial business strategy for growth**.


DAVE ARCHER
VICE PRESIDENT

New Associates Add Expertise

To assist our clients in dramatically improving quality, reducing costs and increasing profitability, we have broadened our expertise by adding several new associates to our team.

We have strengthened our experience in DFA/DFM and related concurrent engineering practices, as well as added the Munro Quality Report Card and Assembly Ergonomics to our strategic offering.



A proven quality expert, **Ivan K. Chambers, Associate**, has more than 25 years of experience in engineering and has helped numerous companies reap substantial savings.

Ivan is helping clients optimize product designs for cost, cycle time, quality and performance by incorporating Six Sigma quality systems to achieve virtually defect-free — 3.4 defects per millions — production. Before joining our team, he spent 13 years with Texas Instruments.



David D. Foreman, Associate, specializing in ergonomics, earned the 1994 President's Award from the Institute of Industrial Engineers for his work in this field.

He brings clients practical experience in ergonomic analysis—also known as human factor engineering—and linking it into the concurrent engineering principles of DFA and DFM. David joined us from MKSG, Inc., a Detroit-area ergonomics software provider.



Robert D. Meese, Associate - West Coast Representative, is an experienced engineer and manager with more than 20 years of experience in manufacturing and development.

A champion of DFA/DFM while spending 17 years at IVAC Corporation, Bob helped the California-based medical equipment manufacturer generate dramatic savings on a number of products as well as

a strategic change in the company's corporate culture.



Michael S. Oakes, Associate, has gained solid experience in applying DFM principles to realize cost savings, time-to-market

reductions and quality improvements. He joined the company from Electronic Data Systems (EDS) at General Motors' Vehicle Launch Center, where he was a DFM Center of Expertise representative.

At GM he implemented a standardized DFM process for a variety of automotive components and was involved in planning, coordinating and facilitating numerous DFM workshops.



Angela M. Maidment, Associate - Marketing & Communications, brings several years of client and customer service experience to

the company. Angela will ensure close communication with clients, including providing project documentation and coordination of scheduling for consulting services and workshops. She will also assist in the marketing and promotion of the company and its expanding range of services.

She joined the company from Electronic Data Systems (EDS), where she served the Buick Motor Division on customer relations issues since 1994. Earlier, she was a journalist and news producer with WJRT-TV in Flint, Mich., an office manager with Consumers Power Company, and an assistant at the University of Michigan's Clinical Research Center.

McDonnell Douglas

cont'd. from pg. 1

Savings generated by the team's product redesign included:

- ✂ **Slashing the number of assembly operations by 96 percent (210 to only 8);**
- ✂ **Cutting assembly time by 94 percent (46 minutes to 3 minutes);**
- ✂ **Reducing part count by 80 percent (from 15 to 3); and,**
- ✂ **Slicing weight by 62 percent (2.1 ounces to .8 ounces).**

A second DFA/DFM project tackled by a Douglas Aircraft team was the redesign of the ram air door assembly—the part that allows outside air to enter the cabin's air conditioning system. Two key issues addressed in the redesign by the team were serviceability and weight.

The old design of the ram air door, borrowed from the DC-10 and developed more than 25 years earlier, had approximately 2,172 parts and was both difficult to install and service. The redesign resulted in a **33 percent** weight savings, eliminating 107 pounds per airliner. The team also eliminated **36 percent** of the parts and cut assembly time by **34 percent**.

In an industry that has become intensely competitive, McDonnell Douglas has realized the benefits—and potential—of incorporating DFA/DFM throughout its operations and culture.

"Through hands-on results-oriented workshops, Munro & Associates has provided us with the key insight, leadership and tools to make DFA/DFM an integral part of several of our existing products," said Ron Suiter, General Manager-A/C Systems and Interiors for McDonnell Douglas. "But it hasn't stopped here. By making DFA/DFM part of our corporate culture, we will also be able to improve our future products and processes."

Munro & Associates Services and Capabilities

- ▲ Strategic product planning assistance for executives
- ▲ Executive and engineering management paradigm presentations
- ▲ Facilitation of hands-on DFA/DFM workshops and training
- ▲ Long-term implementation assistance for DFA/DFM principles
- ▲ Design for Serviceability/Recycling assistance and Design for Reliability services
- ▲ Munro Quality Report Card — quality analysis/consulting
- ▲ Value-analysis/Value-engineering evaluation
- ▲ Competitive benchmarking and Pugh analysis
- ▲ Manufacturing methods, assembly ergonomics and plant layout evaluation
- ▲ Production line balancing consulting
- ▲ Product design and re-design services
- ▲ On-going support for corporate DFA/DFM programs

Open Enrollment for Quality Session

We're offering open enrollment for two-day workshops on the new Munro Quality Report Card™ program. The first workshop session is planned for August and will be held in our new training facility at our expanded Troy office. For workshop registration, call Angela Maidment at **810-362-5110**. To learn more about the Munro Quality Report Card, see the enclosed article reprint, *Designing-in Quality*.

The image shows a sample of the Munro Quality Report Card. It is a form with several sections. At the top, it says 'Munro Quality Report Card' and '© 1996'. Below that, there are fields for 'Executive Summary', 'Project Name', 'Customer', 'Product', 'Plant', 'Total Annual Cost of Poor Quality', and 'Rolled Yield'. There is also a section for 'Total parts & value' and 'Quality Score'. At the bottom, there is a checklist of various design and manufacturing considerations, with checkboxes for each item. A small logo is visible in the bottom right corner of the form.

Resources/ References

Write or call Munro & Associates for copies of recent publications:

- ▲ *Designing-in Quality*, Automotive Industries, May 1996
- ▲ *Design for Annihilation*, presentation by Sandy Munro at the Automotive & Transportation Interiors show, May 7, 1996
- ▲ *Ergonomics, Painful If Business Ignores It*, Crain's Detroit Business, Feb. 19, 1996 issue
- ▲ *Perfecting the Process*, Appliance Magazine, December 1995 issue
- ▲ *Keys to DFA Success*, Machine Design, July 13, 1995 issue

Munro & Associates, Inc.

DESIGNLINE

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