



Mathcad Customer References

Mathcad Customers Worldwide

Automotive



Aerospace



Construction



Industrial



Energy & Resources



High-Tech



Pharmaceuticals & Chemicals



Rolls-Royce



Rolls-Royce

Rolls-Royce is global developer of aerospace, marine and energy systems. Mathcad is widely used in the aerospace and warine engineering units for calculation and documentation purposes in engines and ship stabilisation.

CHALLENGES

Used various calculation and documentation tools, including Microsoft Excel & Word

Quality was compromised due to formulas hidden within Excel

Hours were wasted performing “idle tasks”

Errors could not be traced or audited

Programming solutions lacked flexibility

ACTIONS

Conducted cost-justification process to implement enterprise-wide solution of Mathcad

RESULTS

Mathcad selected as the standard environment for performing
Documenting structural calculations on the Rolls-Royce Trent 900 jet engine project by Rolls-Royce.



Lockheed Martin



Lockheed-Martin is the largest defence contractor in the World, specialising in aeronautics, electronic systems, weapons and space systems. The Joint Strike Fighter (JSF) is the largest military program in history.

BUSINESS INITIATIVE

Ensure top quality, shorten design cycles, refine analysis processes - to reduce aircraft weight (a critical design parameter), document critical calculations and create a repository in order to maintain assumptions and enable calculation re-use. These projects can run for up to 50 years or more.



PTC SOLUTION

- Mathcad is used throughout Lockheed Martin.
- The JSF Structures Group has standardized on Mathcad & has made it the standard calculation tool for all subcontractors on the JSF program including Rolls-Royce, Pratt & Whitney, GE, Northrop-Grumman
- Primarily used for structural calculation, (mathematical) analysis and design verification.

RESULTS

- Aggressive mathematical analysis has helped reduce design cycles and make improvements to the weight of the aircraft
- Improved communication between internal project teams and suppliers
- Improved quality
- Formed a platform for re-use

Airbus



Airbus is a leading player in the global aircraft industry. Airbus develops 14 different aircraft models including the A380, the largest commercial airplane and the A400M for military transportation.



BUSINESS INITIATIVE

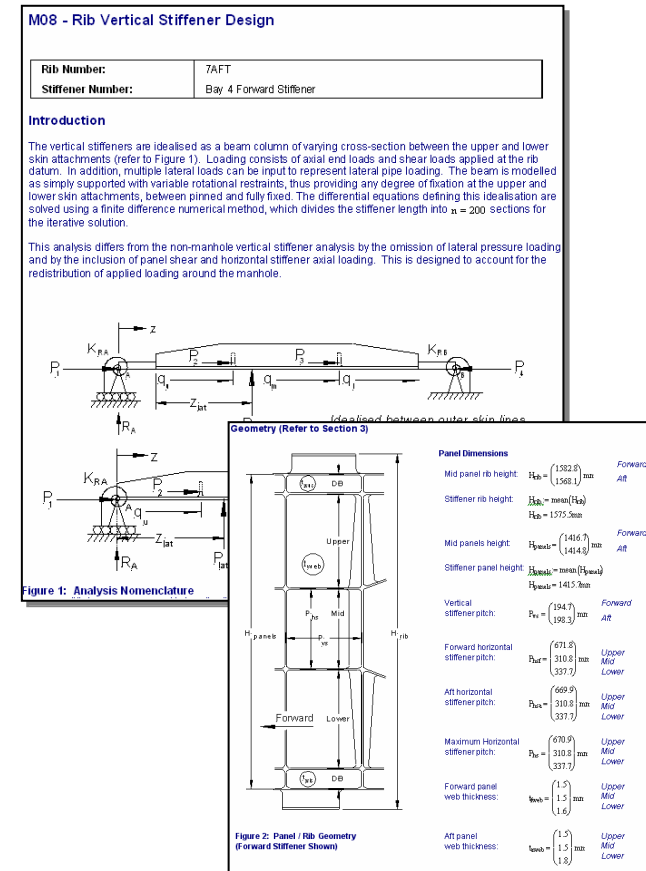
Airbus has Time-to-market goals, need to improve engineering productivity, clarity and re-use.

PTC SOLUTION

- Mathcad is used within structural development, systems engineering, design integration (landing gears, fuel systems), wing, tail and avionic development across 4 key geographies.
- For example, wing development on the RAMSAS project in the UK.
- Mathcad is used in wing rib structure sizing for calculation and analysis where complex mathematics is involved and where standards and safety criteria need to be fulfilled, repeated and reported.

RESULTS

- Mathcad has helped to reduce development and analysis time, increase engineer productivity and give overall better visibility in a complex environment
- Helped document results for clearer understanding by engineering
- Enables engineers to re-use and produce repeatable analysis



Automating BAE Systems



BAE is a leading player in the aerospace and defence industry. Main activities: Aeronautics, Avionics, Missiles, Prime Contracting, Shipbuilding and Systems Integration



BUSINESS INITIATIVE

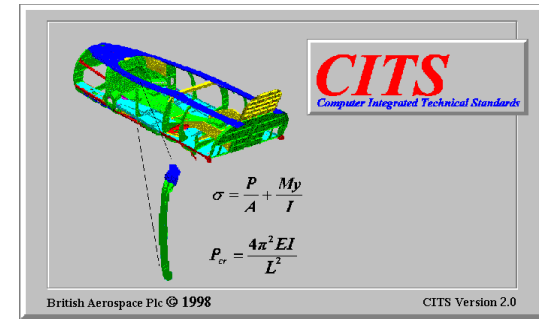
Short-time to market, leverage existing IT Infrastructure to replace legacy systems, integrate with CAD/FEA, adhere to quality standards

PTC SOLUTION

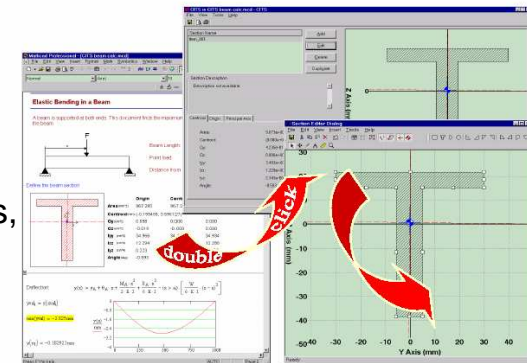
- Have 800 Floating licences being used as part of a Virtual Product Design Management initiative.
- Chiefly used in Structural Engineering & Software Development for stress calculation and analysis, producing product structures, validation of aircraft structure integrity, data automation, algorithm and function development
- Integrated with CATIA & Nastran
- Replacing hard copy reports, legacy programming languages & calculators

RESULTS

- Mathcad has increased engineering process productivity eg. design reviews, re-use, traceability
- Create better data knowledge management
- Significantly improved quality eg. reduce human error in numerical and dimension analysis



CITS



Messier-Dowty have standardised on Mathcad



Messier-Dowty, part of SAFRAN, is the worlds leading supplier of landing gears to the aerospace industry.

BUSINESS INITIATIVE

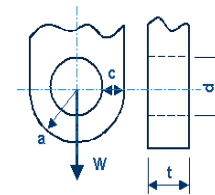
Messier-Dowty need to speed up development, reduce analysis time whilst improving quality.

PTC SOLUTION

- Mathcad has replaced a paper-Fortran-Excel legacy and is primarily used to aid landing gear design and simulation, stick geometry, kinematics and sizing and for analysis of loads and structures (stiffness and strength)
- Typical tasks include matrix manipulation, unit-checking & conversion, unit manipulation, curve fitting
- Mathcad is also used for automating data flow between different applications and data sources eg. standard materials database
- Used for template creation and reporting

RESULTS

- Better access to standard & advanced engineering functions
- Standardise contents, methods and processes
- Better reporting (calculation becomes the report) and visibility of calculations.



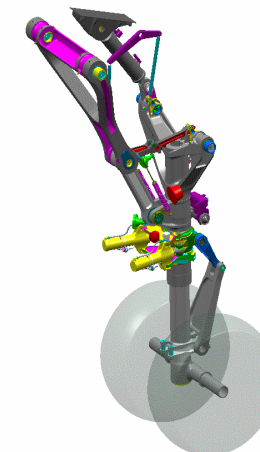
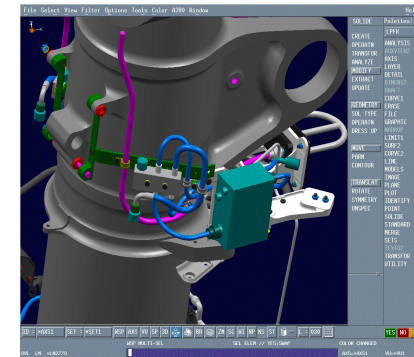
$c := 5\text{mm}$
 $d := 30\text{mm}$
 $t := 20\text{mm}$
 $W := 190000\text{N}$
 $F_{tu} := 1000\text{MPa}$

Wall Thickness
 Hole Diameter
 Lug Thickness
 Applied Load
 Ultimate Tensile Strength

$f_a = 9.5 \times 10^8 \text{ Pa}$
 $RF = 1.053$

$$f_a := \frac{W}{2 \cdot c \cdot t}$$

$$RF := \frac{F_{tu}}{f_a}$$



Aerospace Case Examples

FACC AG



Design & develop lightweight components for aircraft structures & interiors eg. Landing gear doors, wing fairings.

Situation: Issues with Excel during design reviews with customers

Solution: Mathcad used for structural and analysis purposes.

Result: Improved design quality and lead times, subsequently improved customer satisfaction.

Honeywell Aerospace

The Honeywell logo, consisting of the word 'Honeywell' in a white, sans-serif font, centered within a solid red rectangular box.

Situation: Identified Spreadsheet design in Engine Heat Transfer work as a barrier to meeting key management objectives.

Pain: hidden formulas, trace errors, too much repetitive work

Solution: Publishing calculation and design work in templates and electronic manuals using Mathcad.

Result: Improved development time, reduced errors and better re-use.

Mathcad is a standard across Honeywell's global engineering centers.