Model Based Definition

Enables

Inspection Lifecycle Management

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QA is integral part of PLM

Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from its conception, through design and manufacture, to quality assurance, to service and disposal. PLM integrates people, data, processes, and business systems and provides a higher product quality, cost reduction, and expedited delivery time for companies and their extended enterprise.
The 787 outsourcing challenge for QA

Partners Across The Globe Are Bringing The 787 Together

Wing Tips
KOREA

Wing
NAGOYA, JAPAN

Fixed Trailing Edge
NAGOYA, JAPAN

Center Fuselage
GROTTAGLIE, ITALY

Forward Fuselage
WICHITA, KANSAS

Cargo/Access Doors
SWEDEN

Fixed and Movable Leading Edge
TULSA, OKLAHOMA

Engines
GE-EVendale, OHIO
ROLLS-ROYCE-Derby, UK

Engine Nacelles
CHULA VISTA, CA

Forward Fuselage
NAGOYA, JAPAN

Main Landing Gear
NAGOYA, JAPAN

Center Wing Box
NAGOYA, JAPAN

AFT Fuselage
CHARLESTON, S.C.

Passenger Entry Doors
FRANCE

Horizontal Stabilizer
FOGlia, ITALy

Movable Trailing Edge
AUSTRALIA

Tail Fin
FREDRICKSON, WASHINGTON

Wing/Body Fairing
WINNIPEG, CANADA

THE COMPANIES

US
- BOEING
- GE
- SPIRIT
- GOODRICH
- Vought

CANADA
- BOEING
- MESSIER-DOWTY

AUSTRALIA
- BOEING

JAPAN
- KAWASAKI
- MITSUBISHI
- FUJII

KOREA
- KAL-ASD
- MESSIER-DOWTY
- ROLLS-ROYCE
- ALenia
- SAAB

EUROPE
- ALENIA
- SAAB
“Boeing outsourced production around the world, but that caused quality problems and delays that sent the $5 billion development costs soaring - by some estimates to more than $30 billion.

The first plane was delivered three years late, and those delays cost Boeing 160 orders.

"There's no question you lose credibility with your customers," said Randy Tinseth, vice president of marketing for Boeing commercial airplanes.
A real integral part of PLM?

**product lifecycle management (PLM)** is the process of managing the entire lifecycle of a product from its **conception**, through **design** and **manufacture**, to **quality assurance**, to **service** and **disposal**. PLM **integrates** people, **data**, **processes** and **business systems** and provides a **higher product quality**, **cost reduction** and expedited **delivery time** for companies and their extended enterprise.
The inspection challenges
How long it takes to generate a **CNC** program for this part in the PLM world?

3-5 hours to
How long it takes to generate a CMM program for this part?

18-25 hours
Why CMM program takes 5 time longer than CNC program? Because it is not part of PLM? Can it be?
Can this process “integrates”?

1. Inspection starts with **translated** model (IGES\STEP) with blue print
2. **Manual** ballooning on drawing or PDF
3. Model & Drawing requires **Interpretation** for inspection program
4. Inspected **feature’s selection**
5. Annotations (dimensions, tolerance, datum, construction)
6. Parameters
7. **Manual** collision detection & prevention
8. **Engineering change control**
9. **Non standard** communication to CMM machines
10. **Manual reporting** (FAI) with **home grown excel** (for the most part)
11. **Trusted results**
Root cause samples

- The process requires vertical (machine\software) CMM programming expert (non standardization)

- Programming and reporting is time consuming associated with manual labor intensive, interpretation and potential human errors (Delivery time, cost and quality)

- Lack of completeness and integrity due to “broken links” in the process (integrated)

- The industry in general is missing quality assurance data exchange standardization (translation, interpretation, delivery time, cost...)
“As companies receive more and more MBD (model based definition) and the parts get physically bigger, the task of both inspecting the parts and controlling the manufacturing process grow by at least an order of magnitude. Programming the CMM in xxxxxxx no longer takes a day, now it takes a week, and then it takes another week to prove out and understand the part results. Then how do you guarantee that you have checked all the features when you programmed manually?”
ILM – Inspection Lifecycle management as an integral part of PLM

From any native CAD model to trusted inspection results with no translation, no interpretation and no data entry once entered
ILM process example – model & drawing stage
Automated ballooning and part inspection requirements analysis
(eliminating user inspection interpretation)
CAD model validation having all needed inspection information
CAD model converted with all required inspection information including views and balloons
Creating inspection planning “package” electronically
Part inspection completed in minutes as all required information converted from the CAD model.
Inspection planning & results directly from the CAD model and from any CMM machine or other inspection tools.
First Article Inspection report in one click..

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<th>Result</th>
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Inspection program & reporting (including FAI) in minutes rather than hours ...or days with trusted inspection results
ILM can be an integral part of the PLM

Inspection lifecycle management (ILM) automates and manages the entire integrated quality assurance process from design to manufacturing to inspection to trusted inspection results.