



# **How do you know when your Design is right ?**

*Presentation by Rob Coles - MDI*



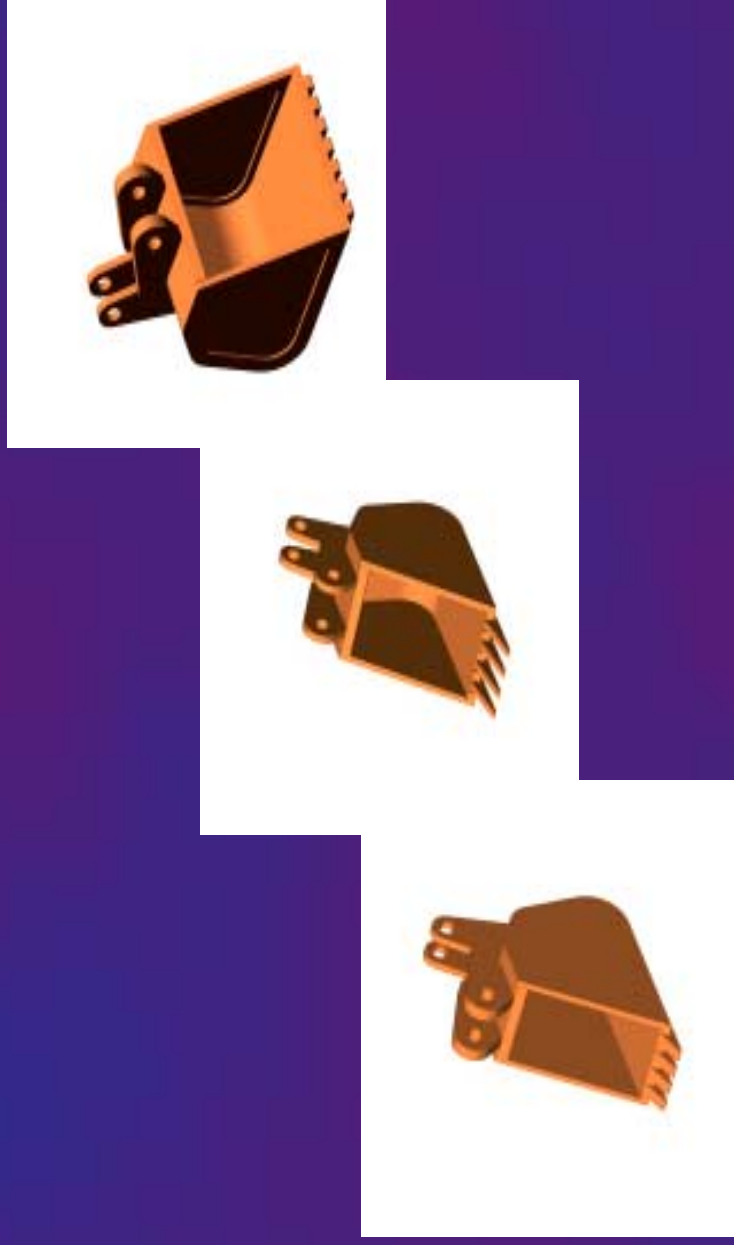
# The Engineering Problem



**And so the Head of Design sets material  
in reduction as a goal for someone who is  
Designers**



# The Engineering Problem



**The Designer uses his experience to  
Create some options**



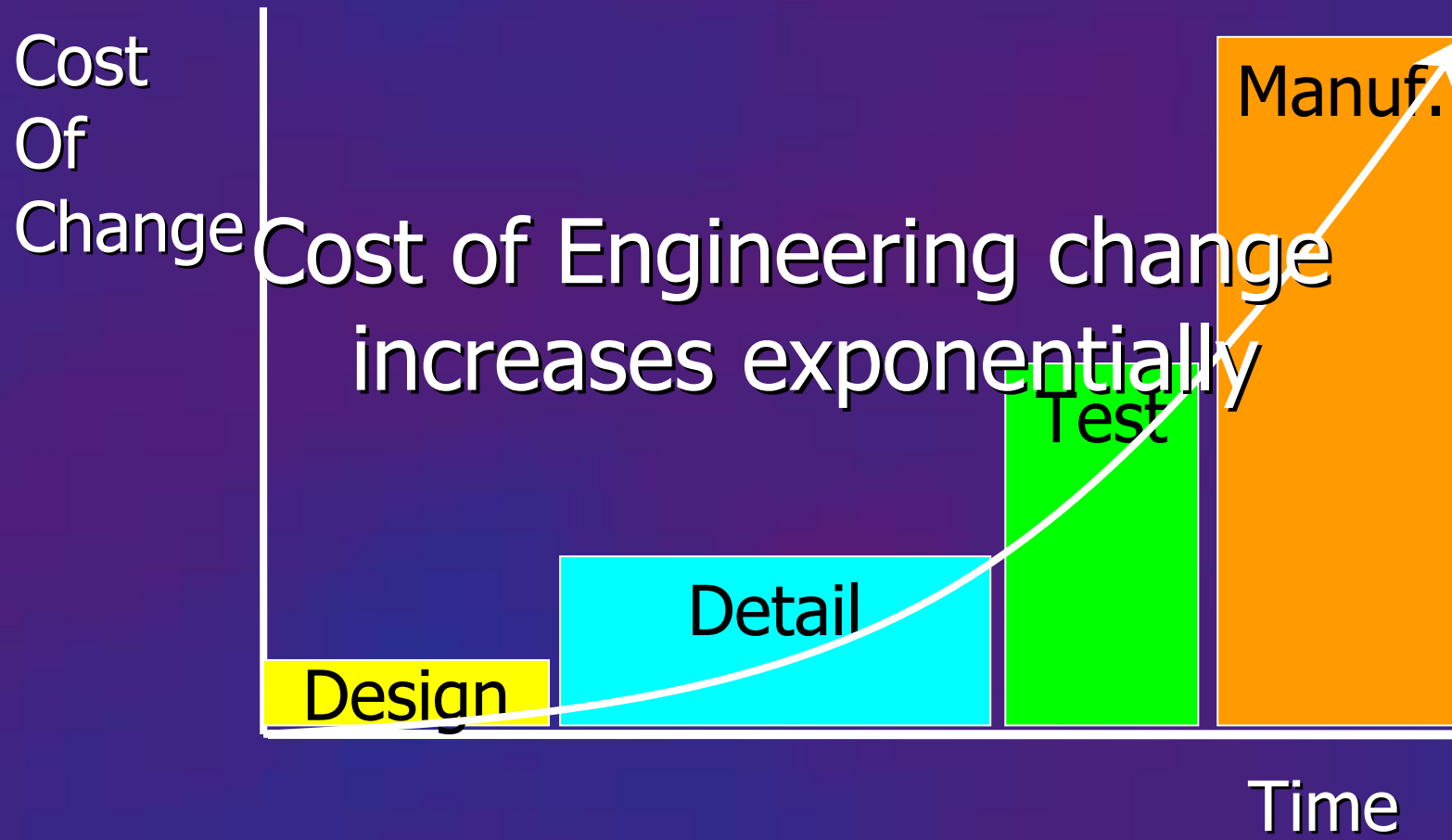
# The Engineering Problem



**But how does he know that his new design still meets the original functional specification ?**

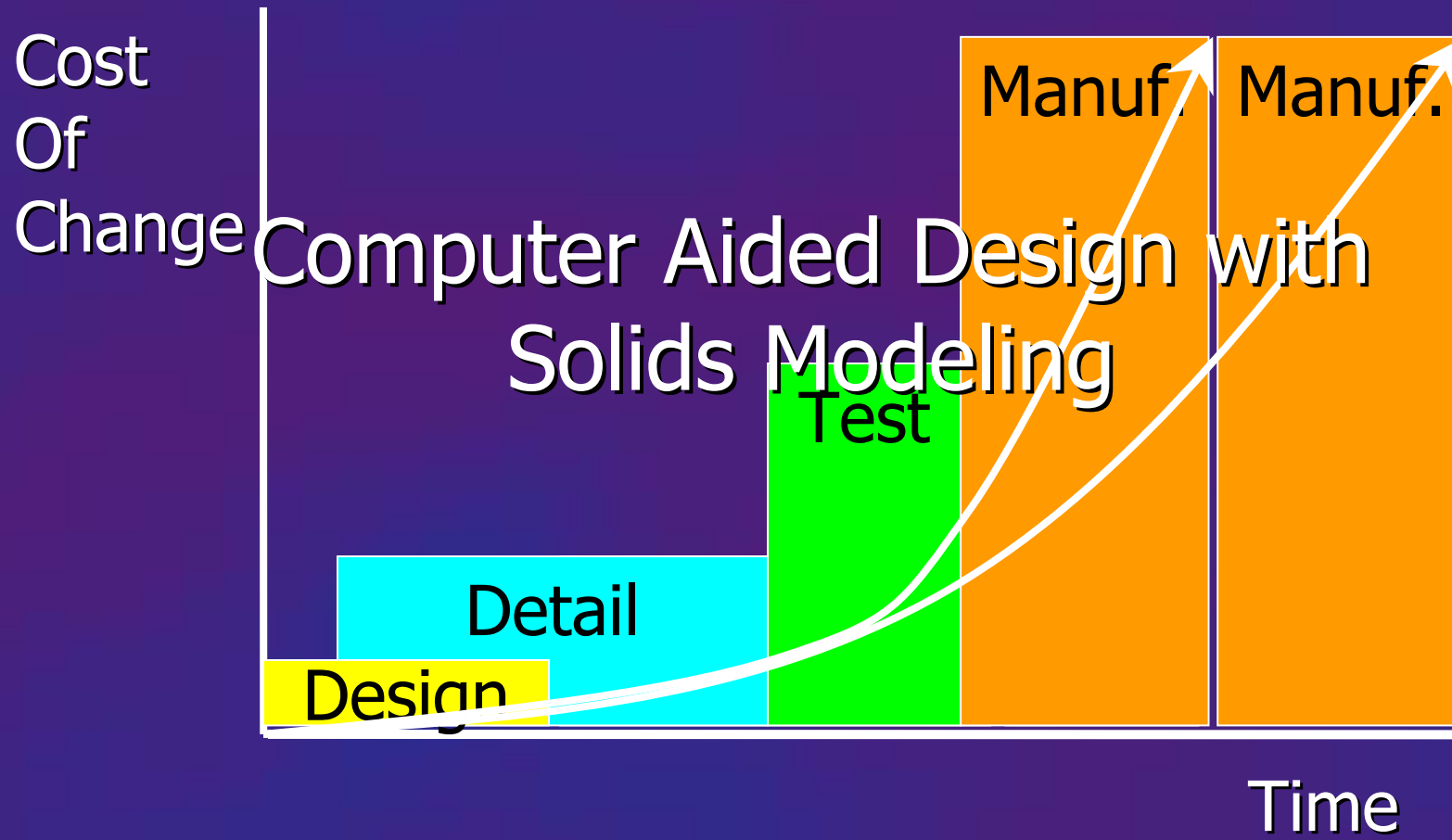


# Understanding CAE





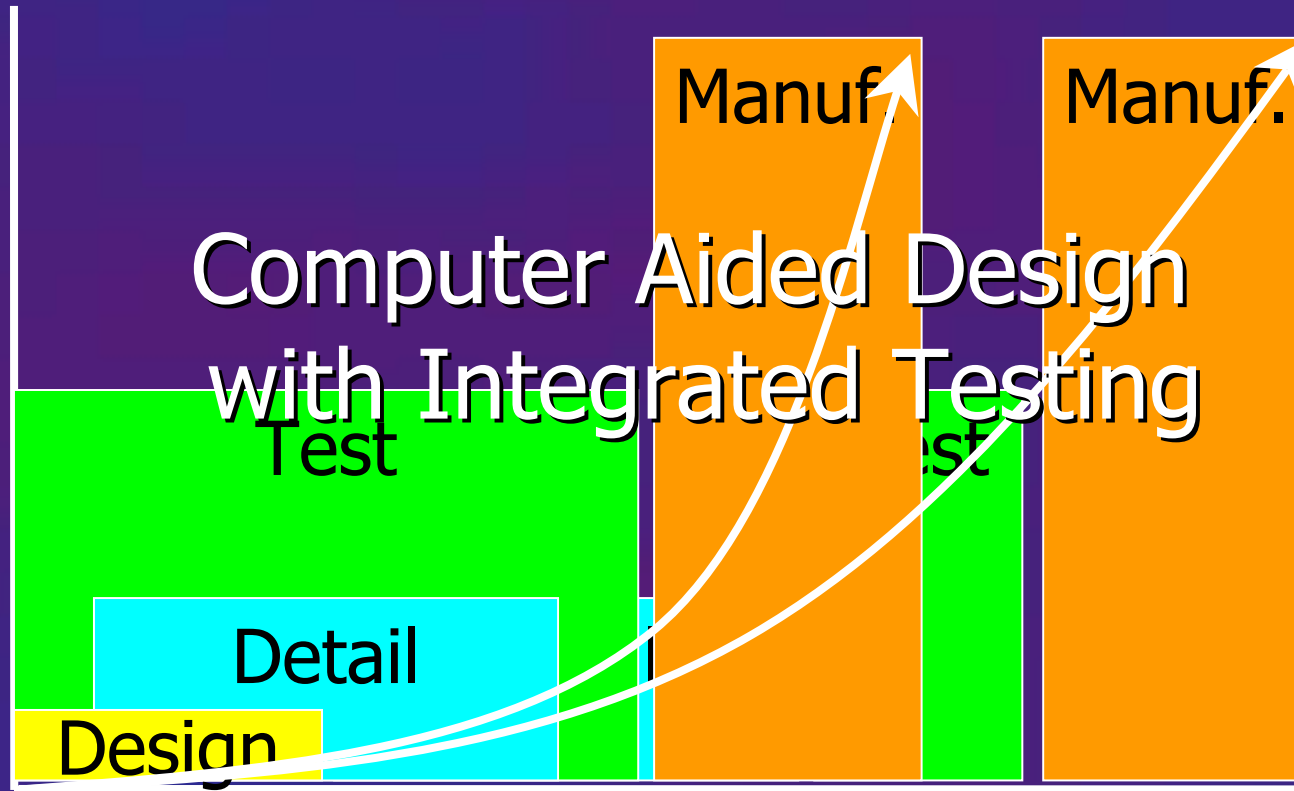
# Understanding CAE





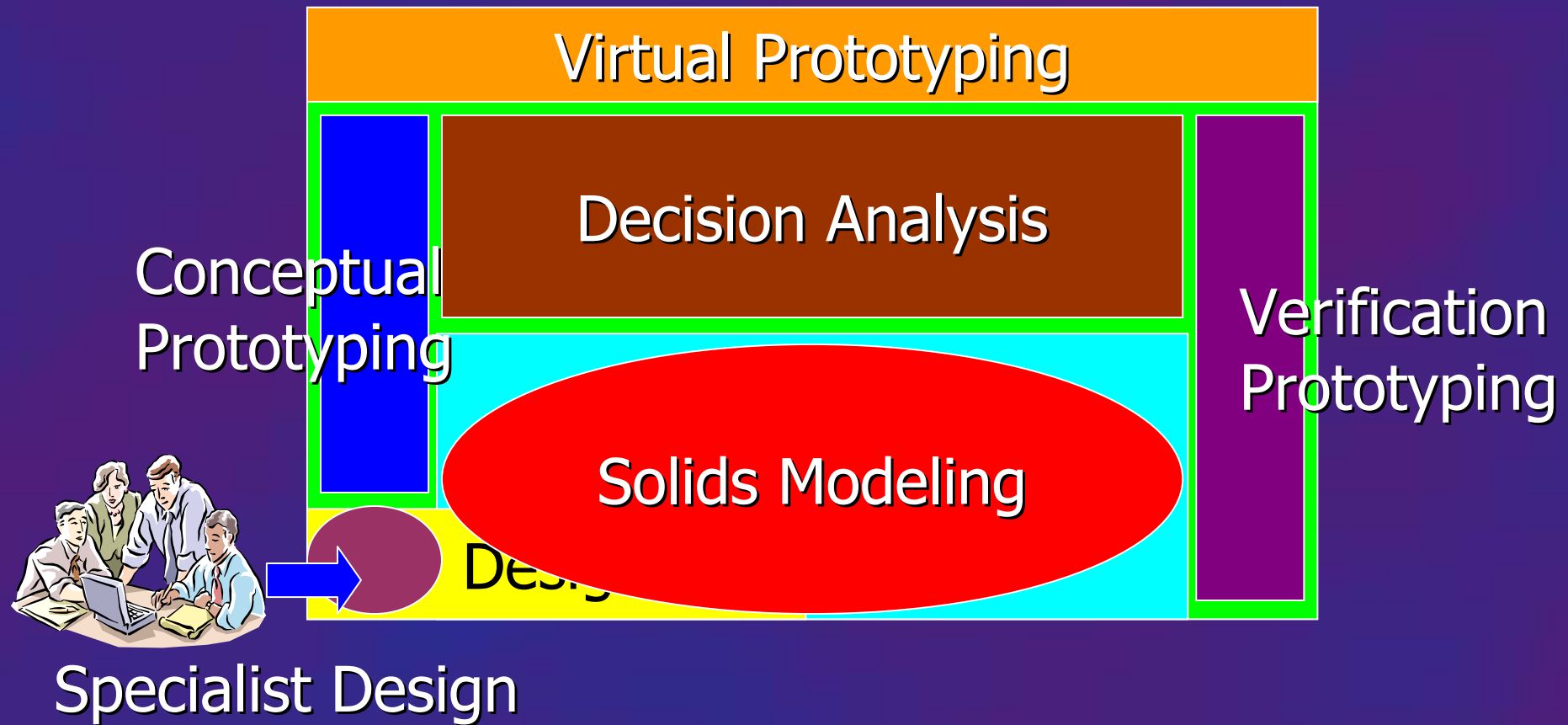
# Understanding CAE

Cost  
Of  
Change



Time

# Understanding CAE







# Conceptual Prototyping

- Project undertaken by Specialists
- Little CAD data used – mainly legacy
- Specific Engineering Specialism e.g. Suspension
- CAD model driven by conceptual prototype



# Decision Analysis

- Design centric process
- CAD based due to iterative process
- Fast solving to meet demand for reduced time-scales
- Design focussed solving

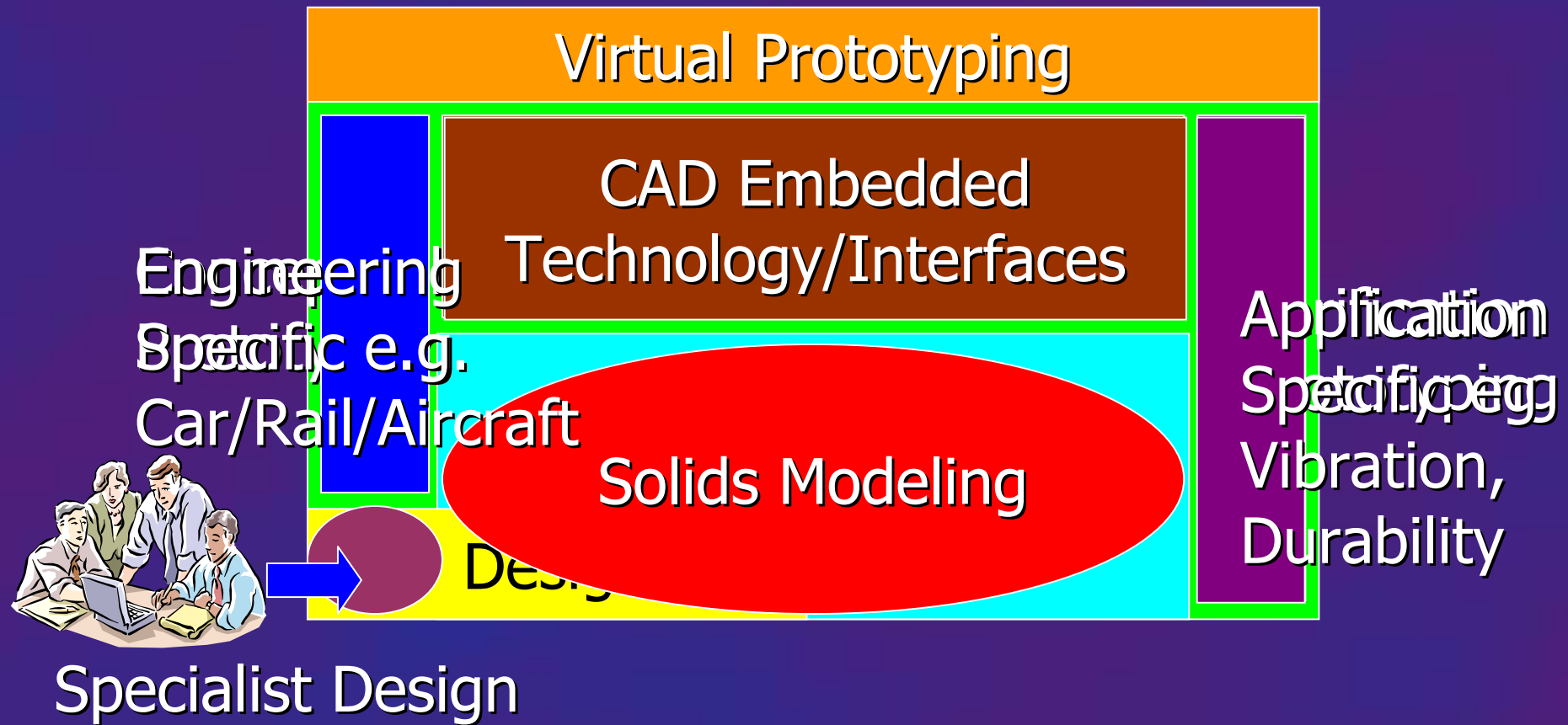


# Verification Prototyping

- Project Undertaken by Specialists
- Complex Assembly techniques
- Highly accurate solving
- Expert Interpretation
- Application Specialism

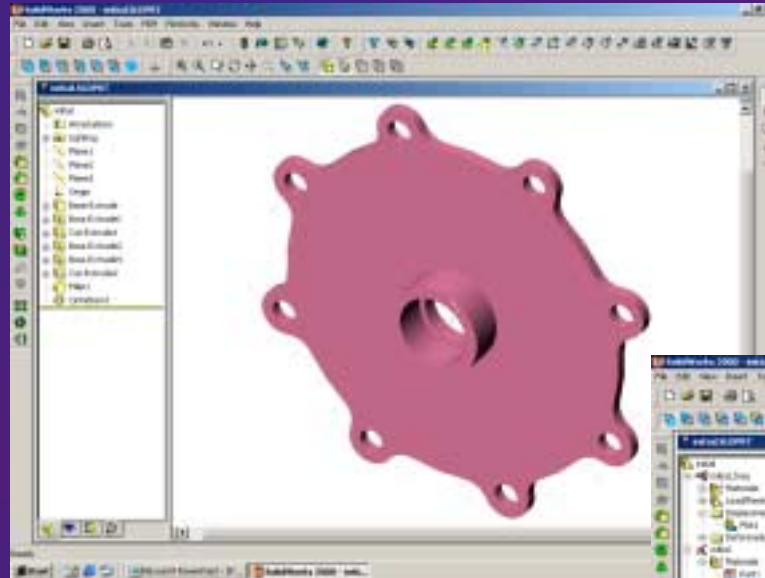


# CAE Technology



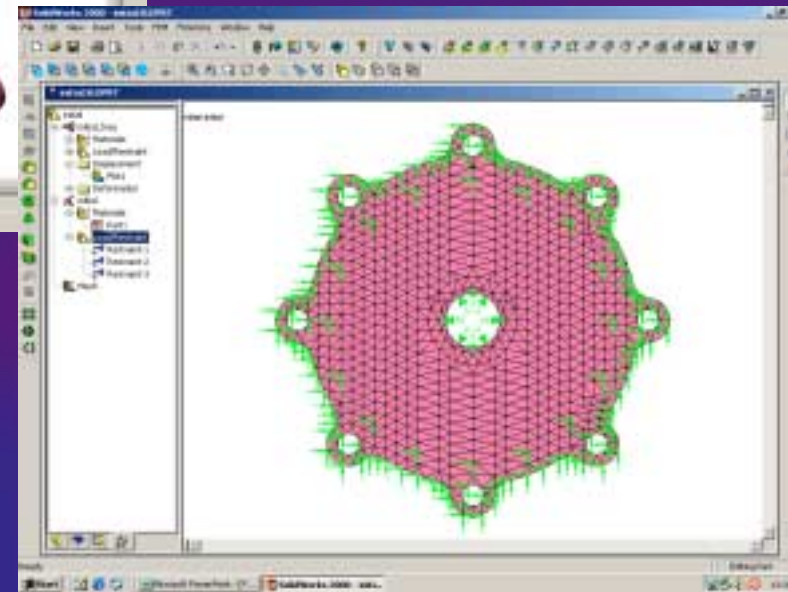


# Decision Analysis

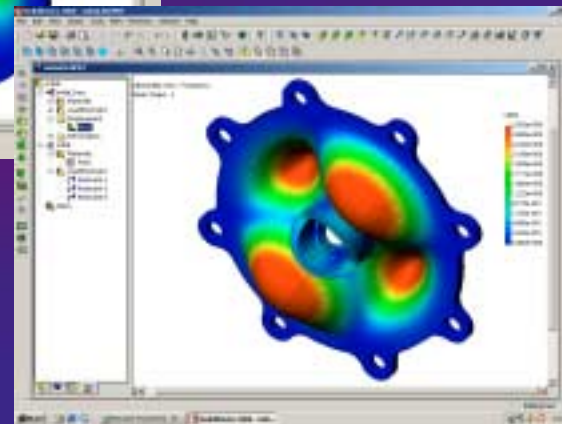
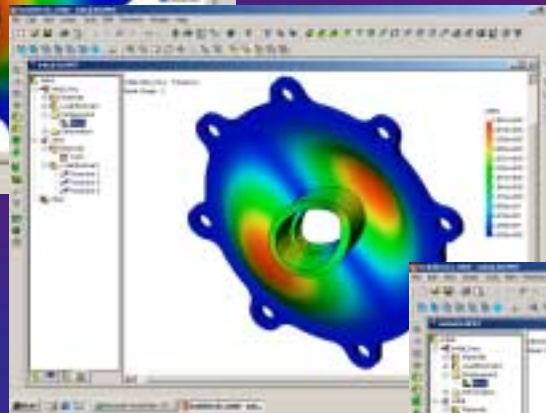
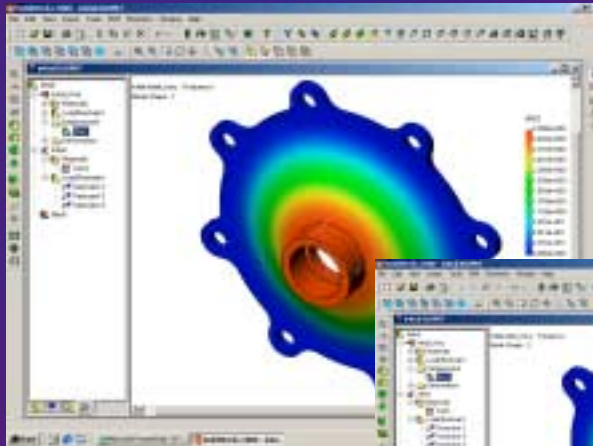


Initial Design in  
Windows based  
Solids Modeller

Forces calculated from  
and Boundary Conditions  
added in Embedded  
Analysis technology



# Decision Analysis



## Initial Results

F1 3400Hz

F2 9500Hz

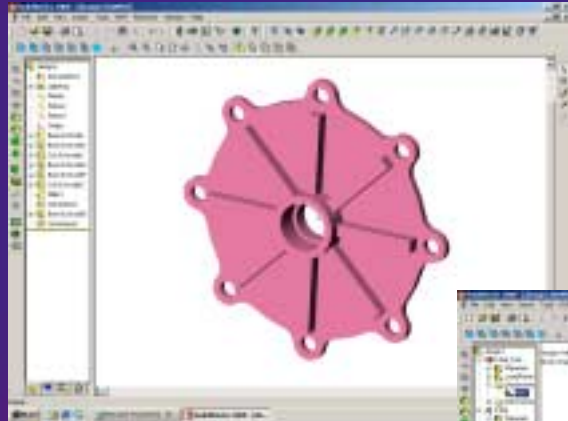
F3 9500Hz

F4 14000Hz

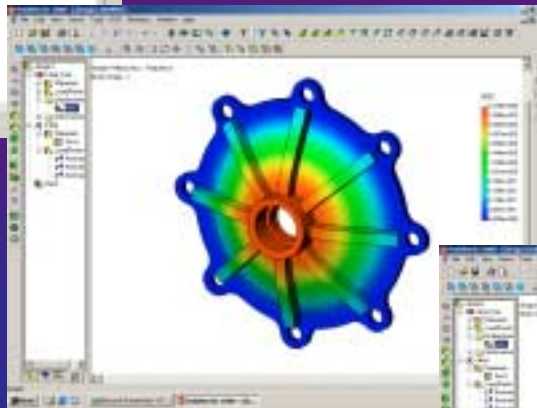
F5 16000Hz



# Decision Analysis



Ribs  
added to  
basic  
design



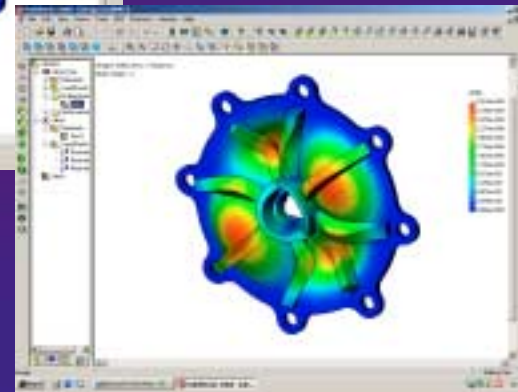
F1 5200Hz

F2 10600Hz

F3 10600Hz

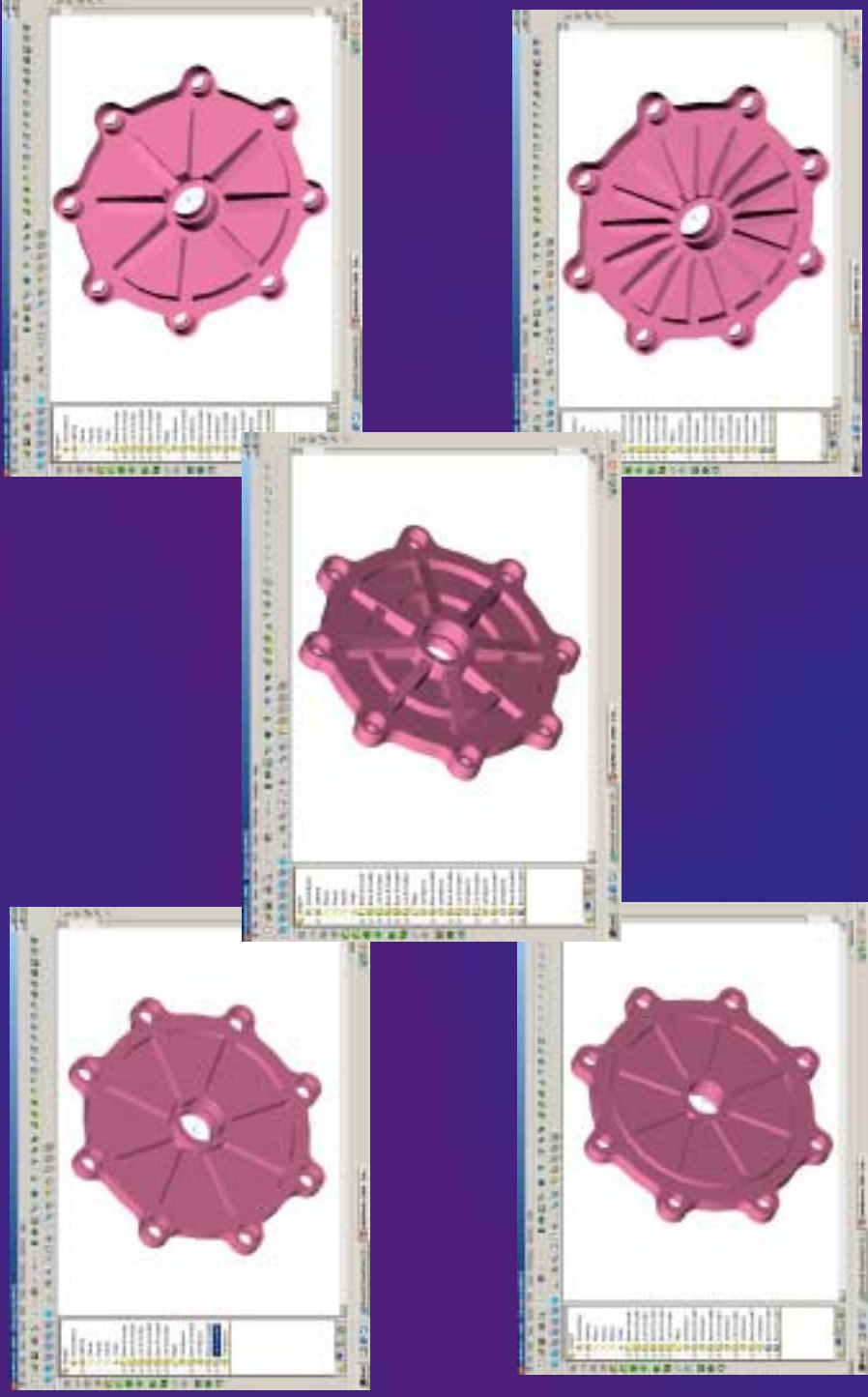
F4 10700Hz

F5 10700Hz





# Decision Analysis

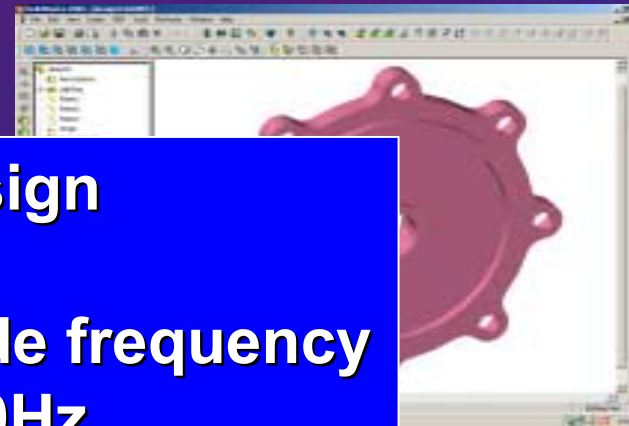
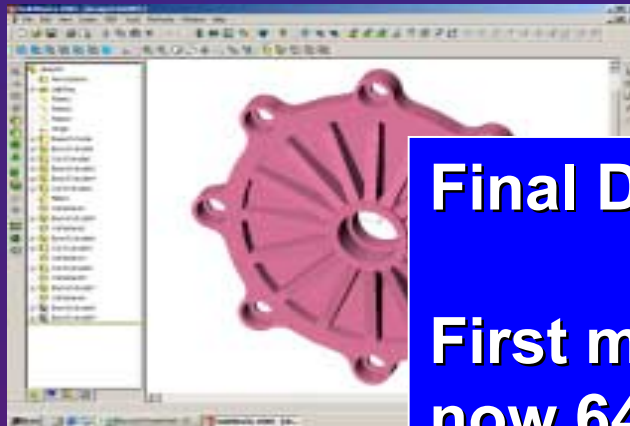


ADAMS



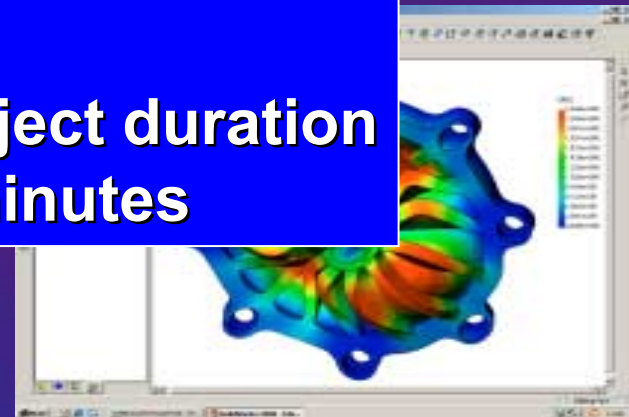
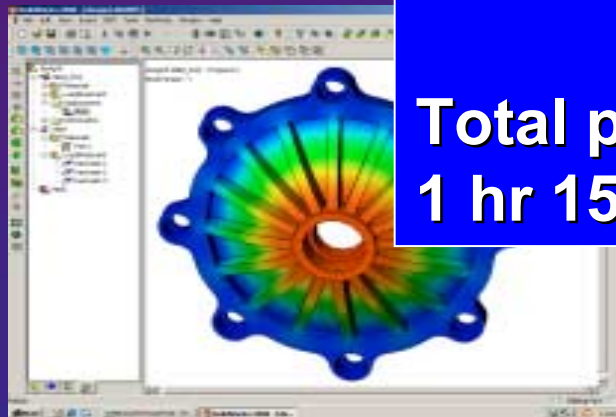


# Decision Analysis



**Final Design**

**First mode frequency  
now 6400Hz**



**Total project duration  
1 hr 15 minutes**



# **Deliverables**

- **Up to 75% reduction in number of prototypes**
- **Up to 40% reduction in time to manufacture**
- **Significant reductions in Rework - both time and materials**
- **Optimised Test Programs**
- **Freedom to explore more adventurous design solutions**
- **Greater Product Knowledge**