



CAD/CAE Model Clean Up



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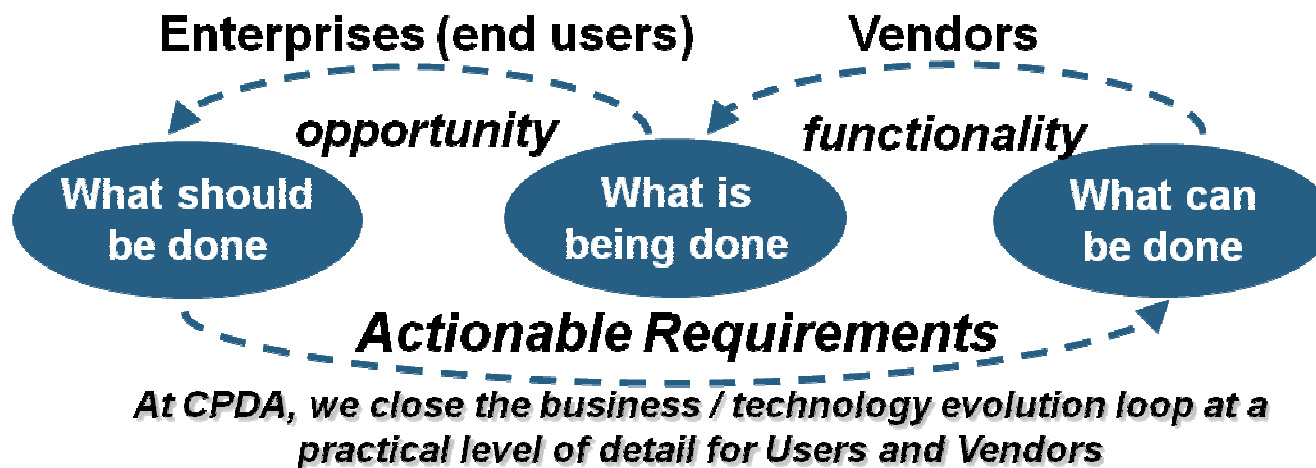
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CPDA

Formerly the PLM group
of D.H. Brown Associates

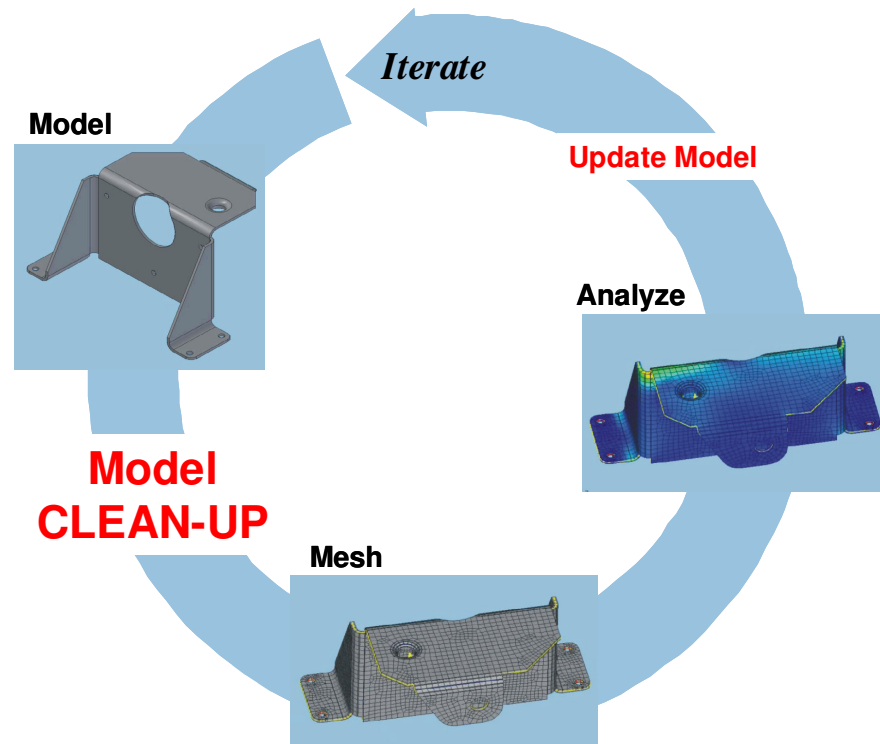
- ❖ CPDA is a leading analysis and advisory services firm that provides strategic assessments and conducts in-depth evaluations of technologies, products, processes, and market trends in the Information Industry for PLM
- ❖ CPDA advises our clients on what can be done with technology through the next 6 to 36 months; what is being done by leading implementers; and where technology solutions need to improve to meet user needs
- ❖ CPDA Value Proposition
 - ◆ Mapping Business Objectives into Technology Strategies
 - ◆ Link Strategists and Implementers
 - ◆ Derive Industry Road Map and Technology Footprint





The CAD/CAE Iterative Cycle

- ❖ **At Issue:** CAD's role in streamlining the finite element analysis cycle of model-mesh-analyze





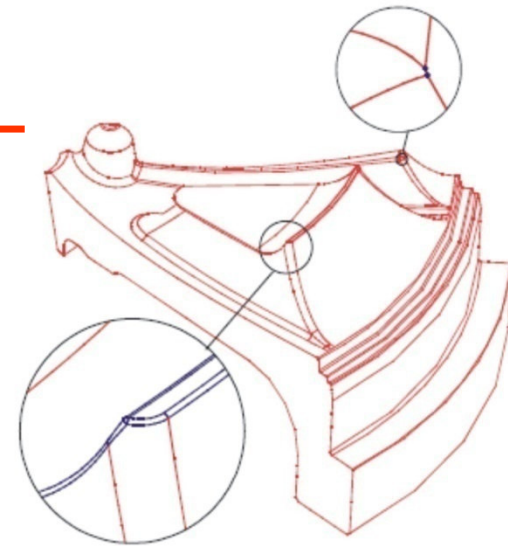
Model “Clean Up” Tasks

❖ Eliminate Model **ERRORS**

- ◆ Fix topographical inaccuracies
 - Closing vertex and edge gaps (water tight solid)
- ◆ Remove sliver surfaces

❖ Remove Geometric **DETAIL**

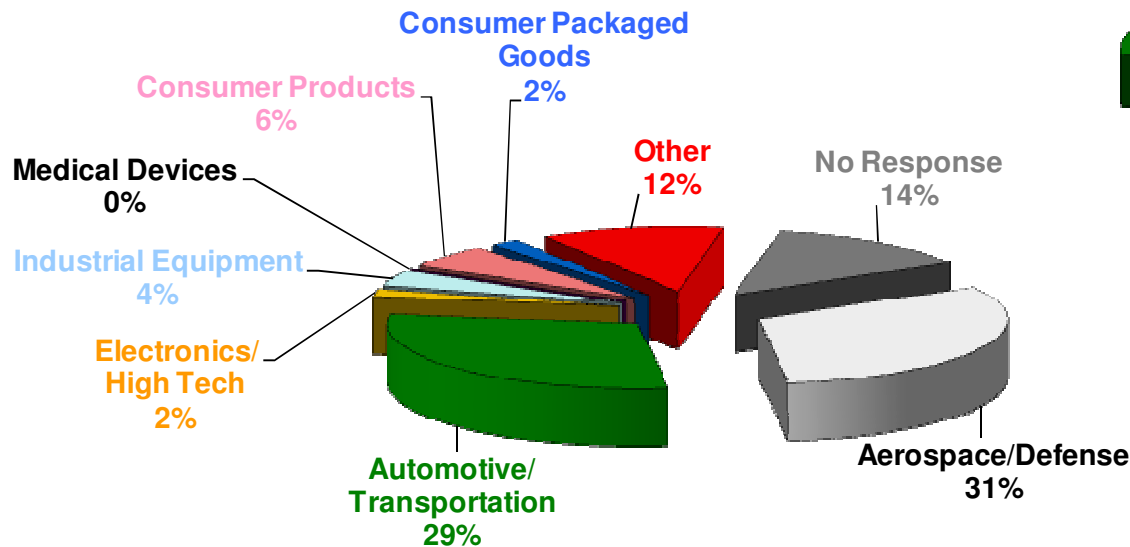
- ◆ Reduce model complexity
 - Suppress small fillets
 - Remove small holes



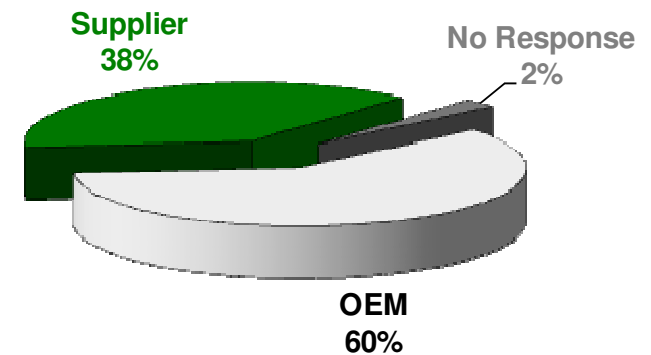


Targeted Survey

INDUSTRY VERTICAL



OEM versus SUPPLIER

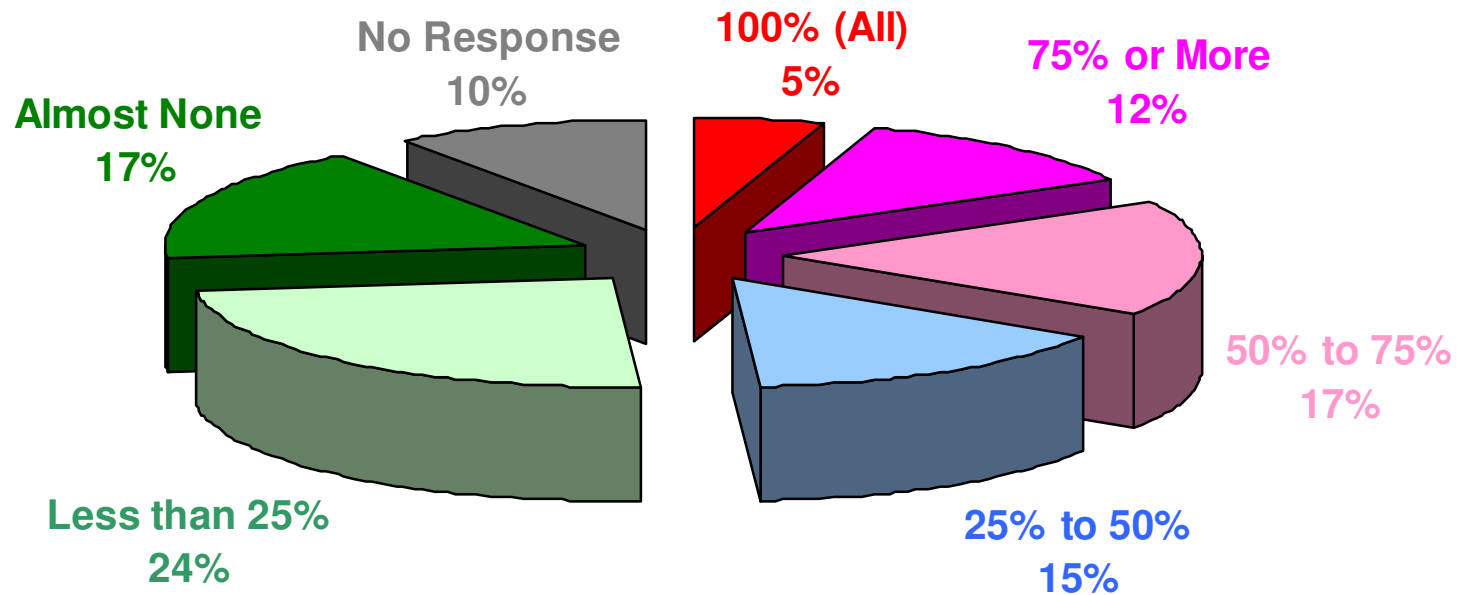


- Automotive & Aerospace account for 60%



ERRORS: Scope of Problem

Percentage of Analysis Tasks that require Clean-up to ELIMINATE ERRORS

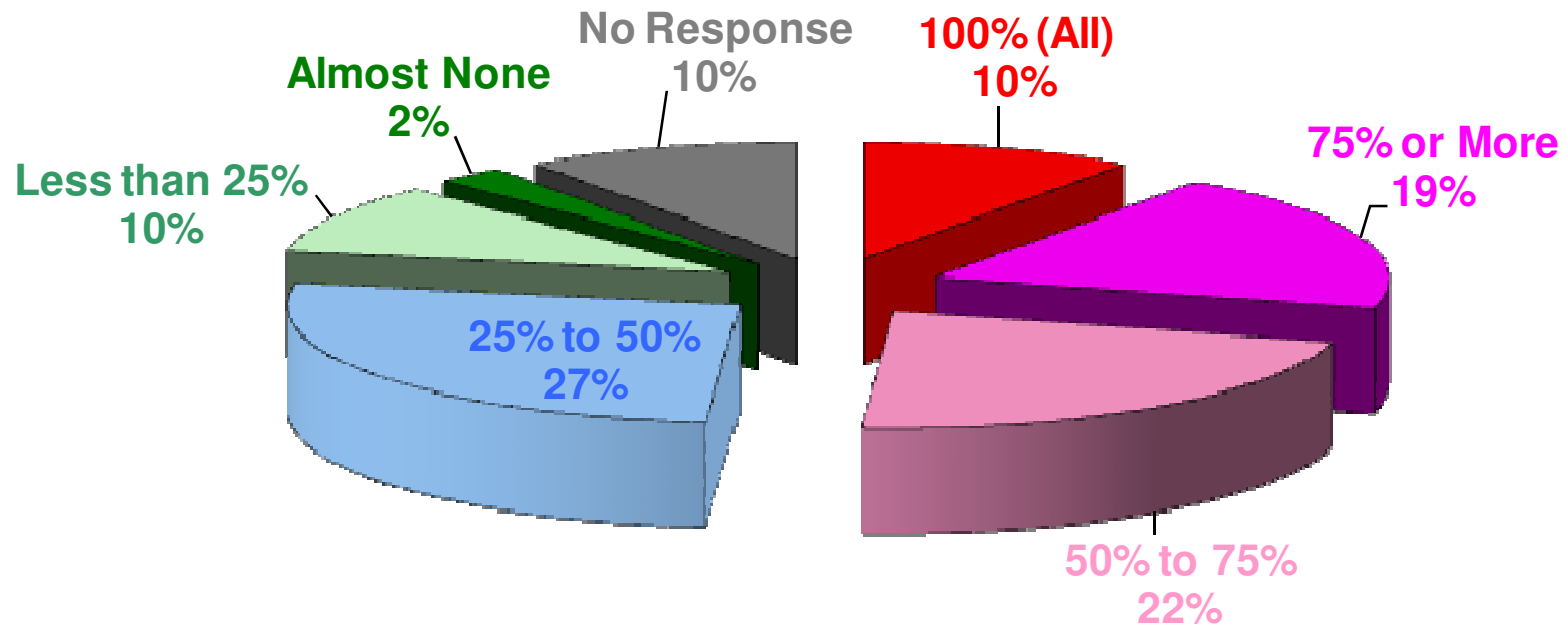


- 34% report over half their tasks
- 41% report less than a quarter



DETAIL: Scope of Problem

Percentage of Analysis Tasks that require Clean-up to REMOVE DETAIL

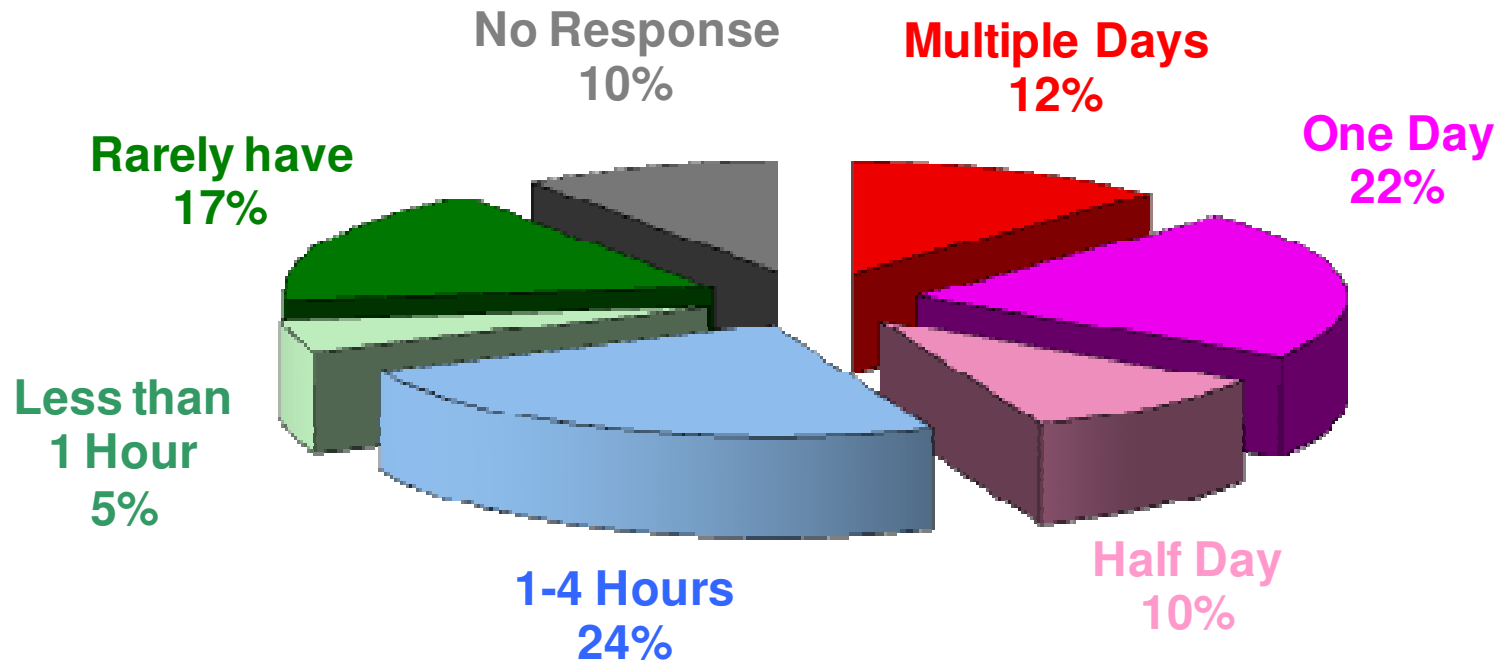


- 52% report over half their tasks
- Only 12% report less than a quarter



ERRORS: Effort to Correct

Time Effort to clean-up ERRORS

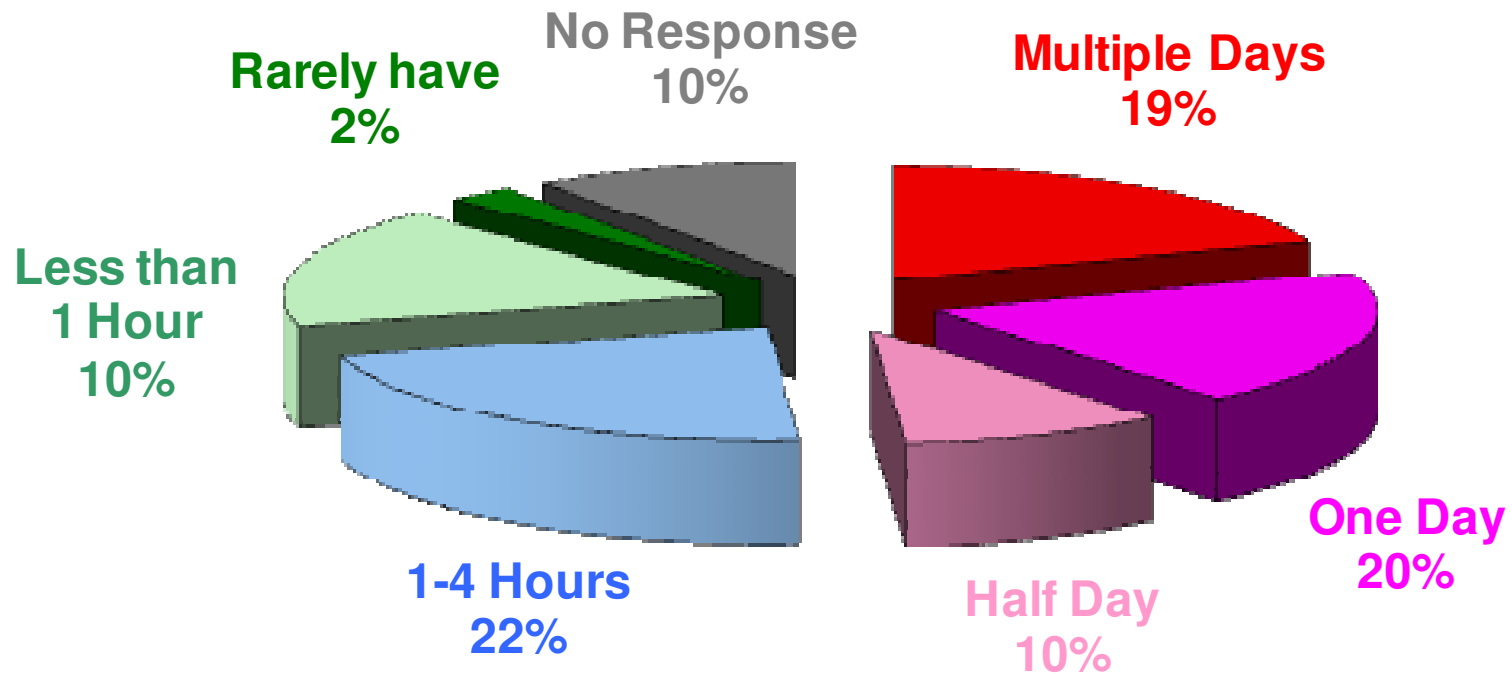


- 44% report over 4 hours
- Only 22% report an hour or less



DETAIL: Effort to Correct

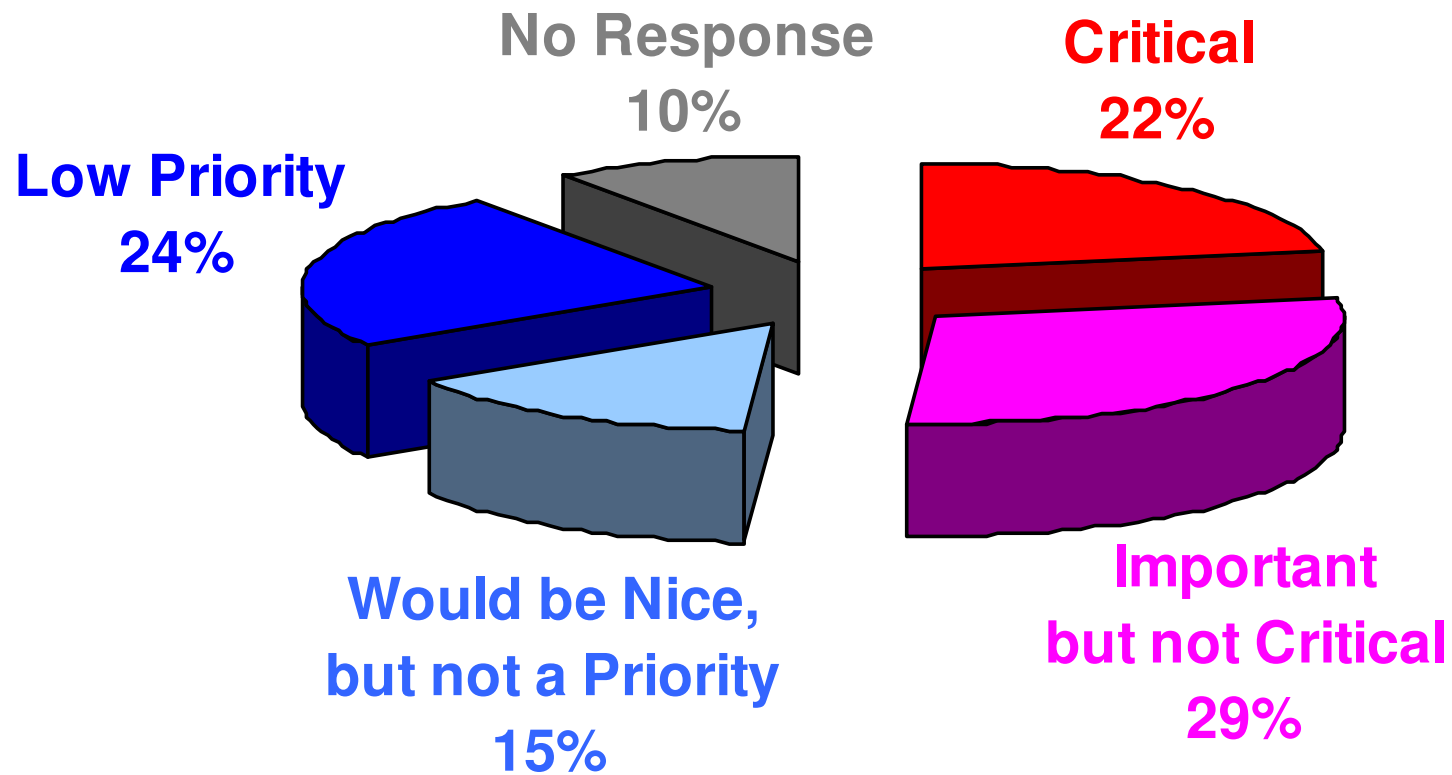
Time Effort to clean-up Geometry DETAIL



- 50% report half a day or more
- Only 12% report less than an hour

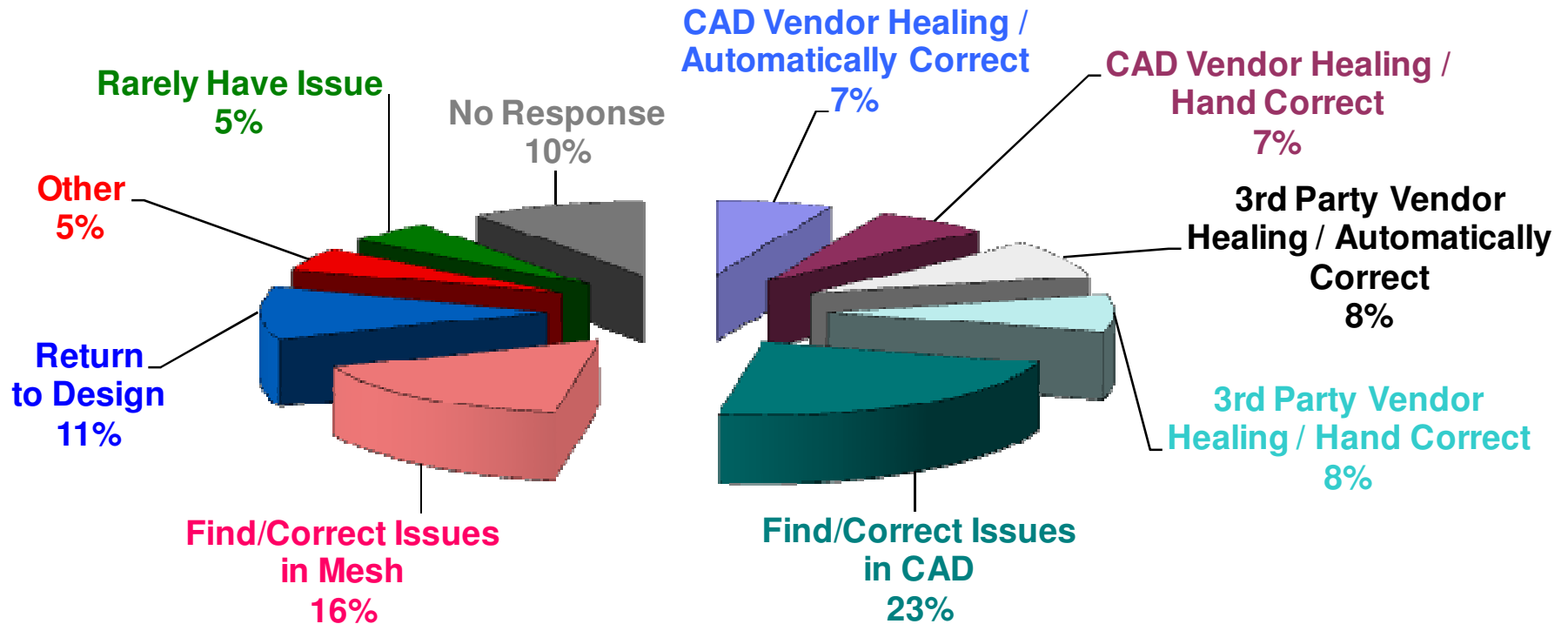


Critical Issue?





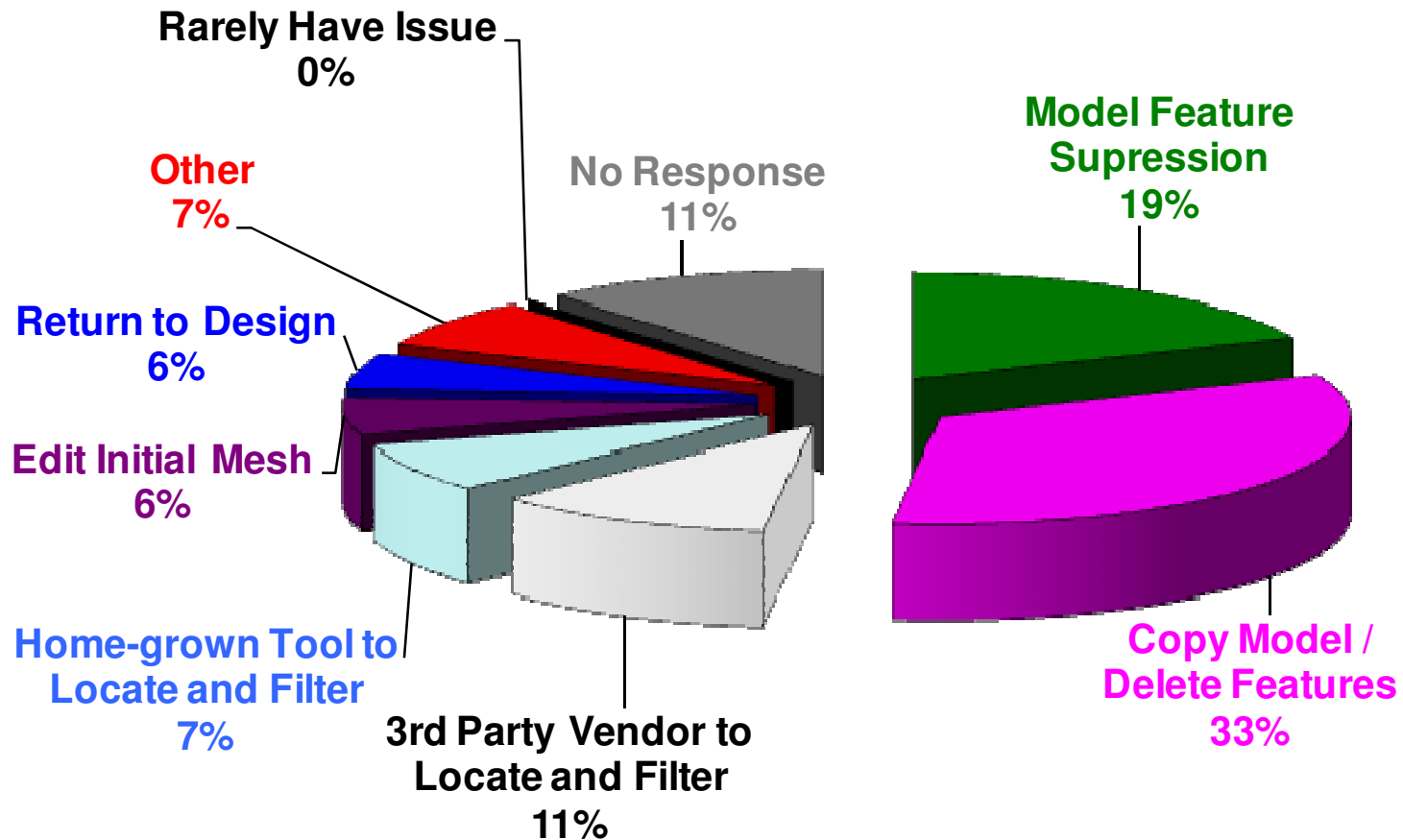
ERRORS: How are they corrected?



- 39% report find/correct totally by hand
- Additional 15% correct by hand



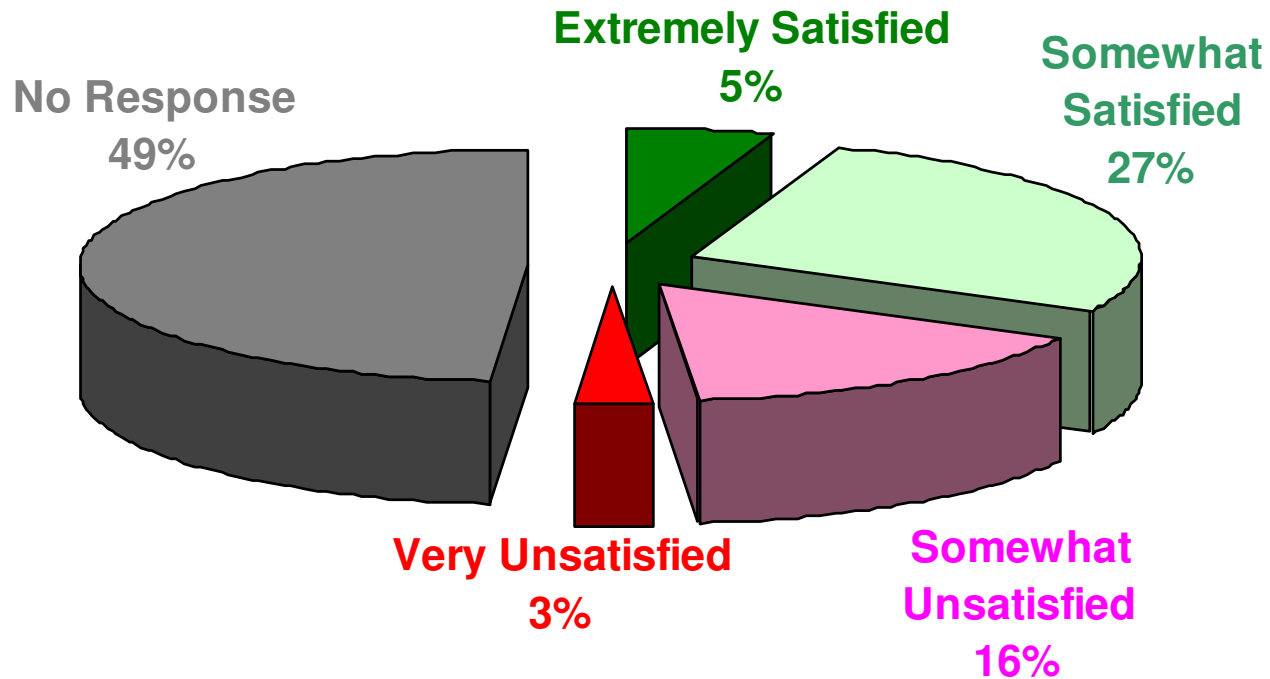
DETAIL: How is it eliminated?





ERRORS: Happy with solution?

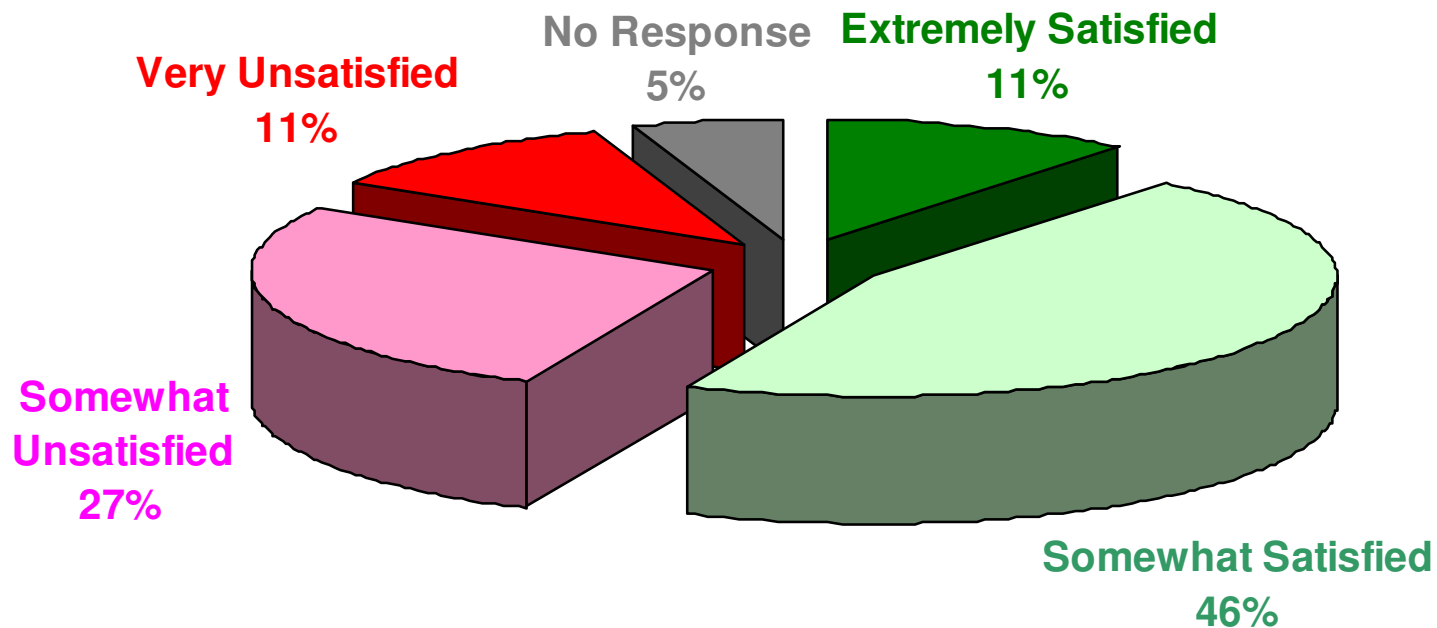
Satisfaction Level with Commercial Tool for Elimination of ERRORS





DETAIL: Happy with solution?

Satisfaction Level with Commercial Tool for Removing DETAIL





Selected Interviews

- ❖ Often constrained by organizational issues
 - ◆ Fixes must be done by analyst who does not know CAD or have access to a CAD license
 - ◆ A few have put in place “CAD data quality” requirements imposed on design engineering, but often have not yet formalized that process
- ❖ Amount of product geometric detail often determined by the type of product under design
- ❖ Many geometric error issues are believed to occur because of data translations between developers in the OEM/supply chain
 - ◆ All said they have “no time” to investigate the root causes



Take Aways

❖ Elimination of Model **ERRORS**

- ◆ Remains a problem for 34% (1/2 their tasks or more)
- ◆ While 41% have only minor or no problems
(Less than 1/4 tasks)
- ◆ 44% take over 4 hours to resolve the problem

❖ Removal of Geometric **DETAIL**

- ◆ Over half (52%) see problems in more than half their models
- ◆ Only 12% see it in less than 25% of models
- ◆ 50% take over 4 hours to resolve problems