

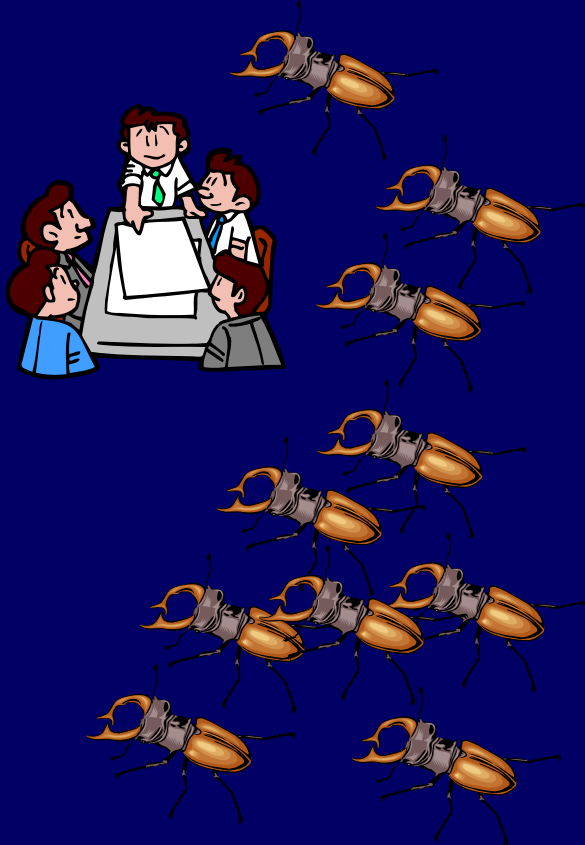
Improved Software Defect Prediction

**SPIN: British Computer Society
23 February 2006**

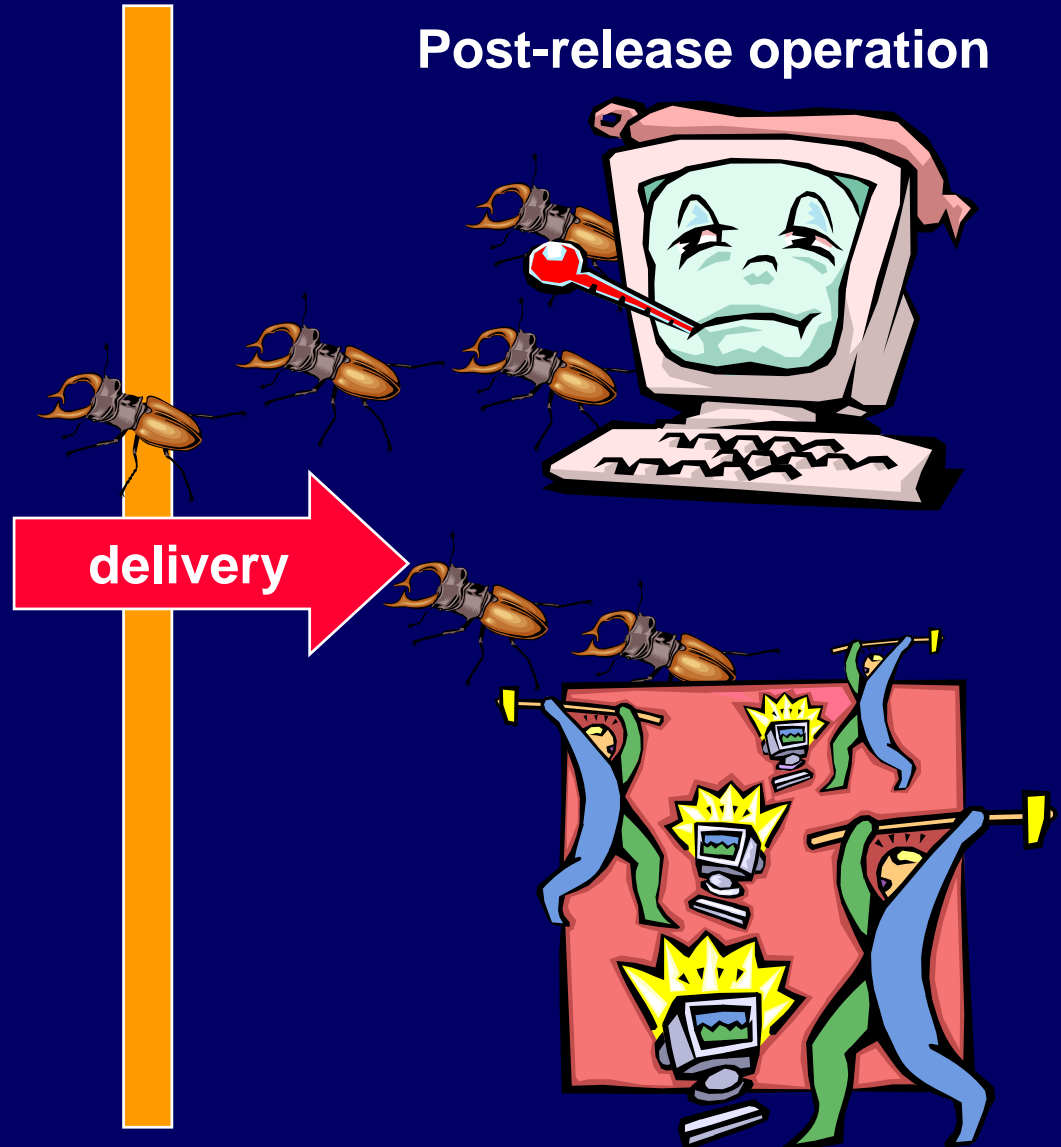
**Norman Fenton
Queen Mary University of London and Agena Ltd**

Using fault data to predict reliability

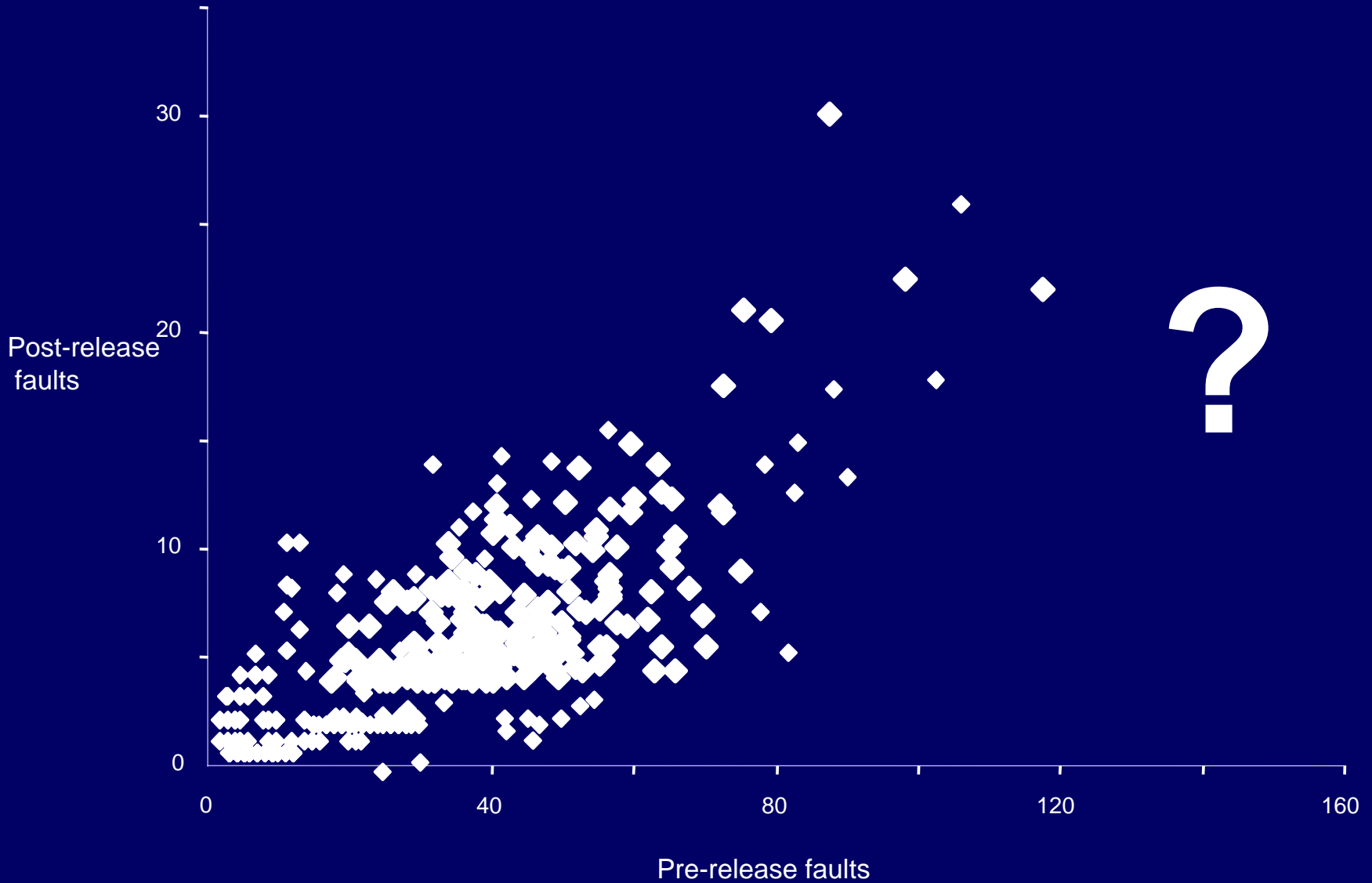
Pre-release testing



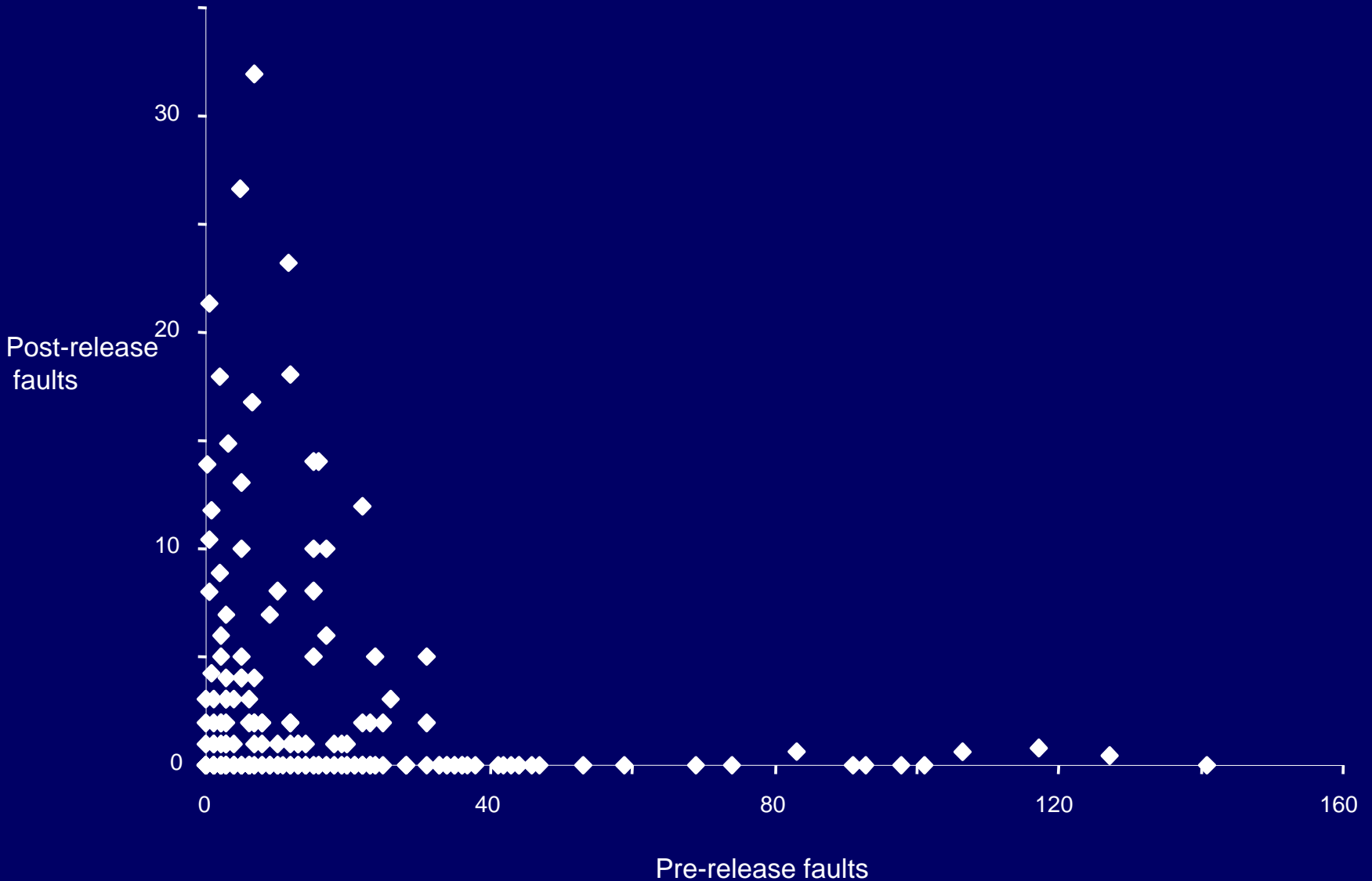
Post-release operation



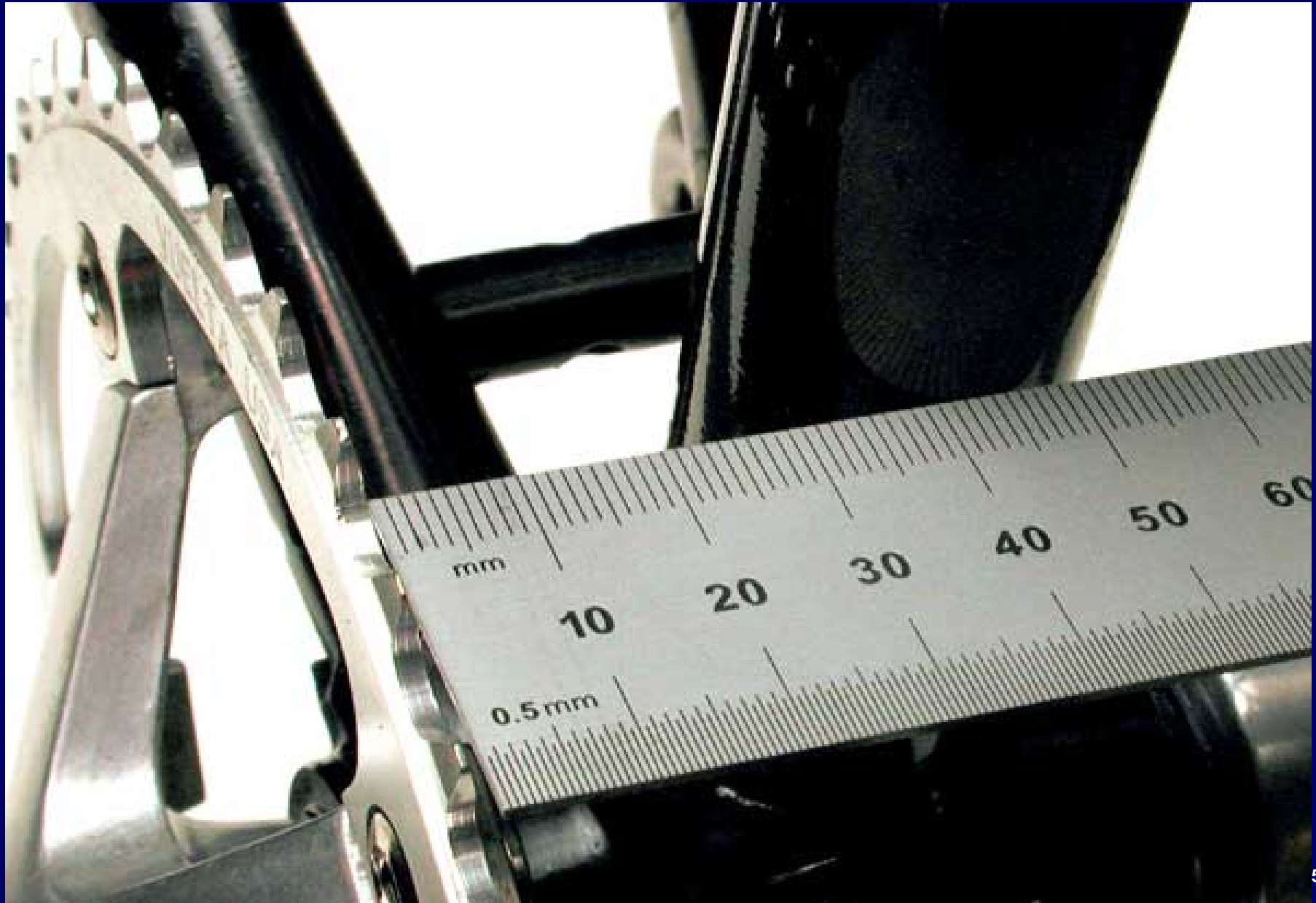
Pre-release vs post-release faults?



Pre-release vs post-release faults: actual



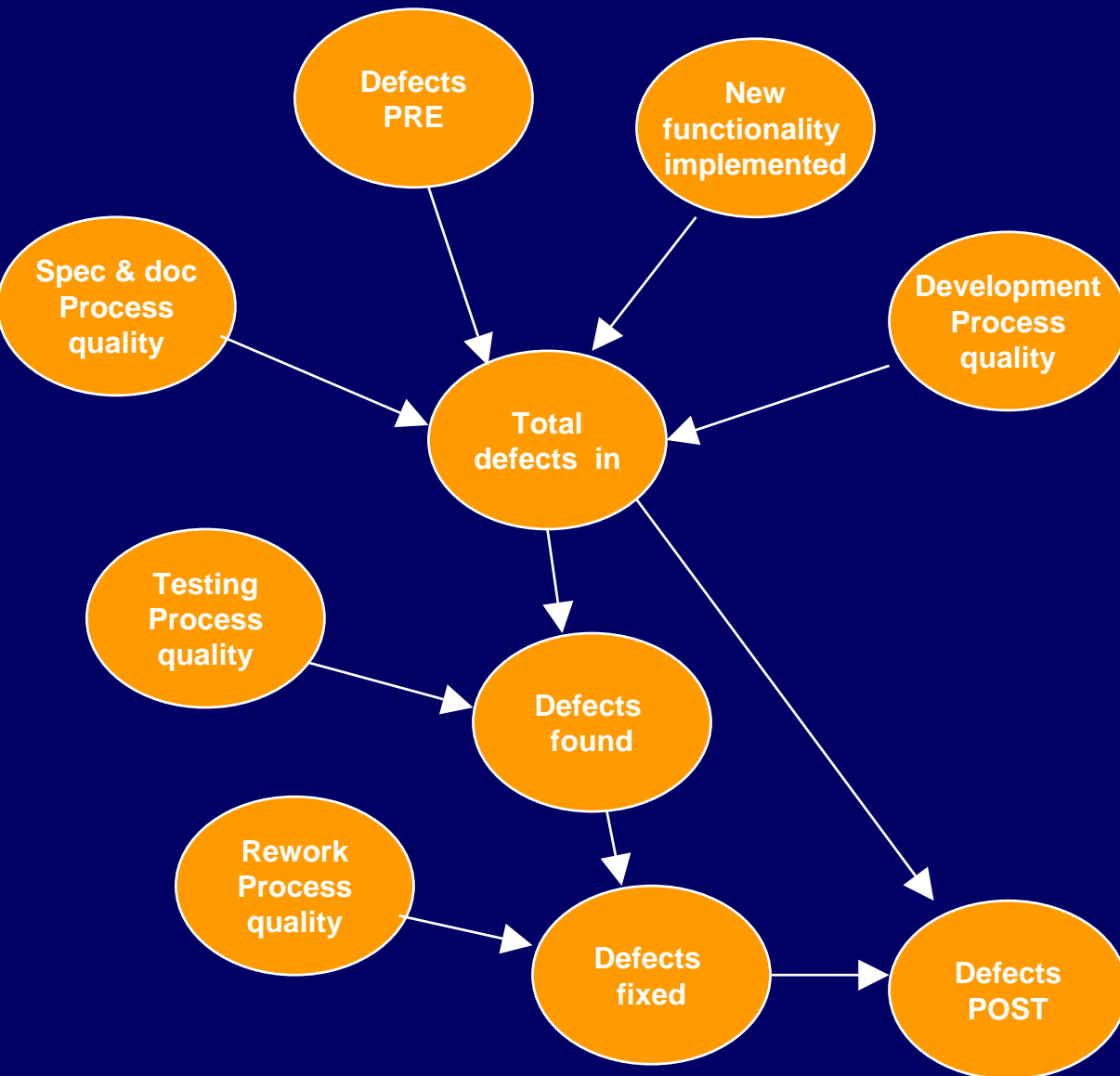
Software metrics....?



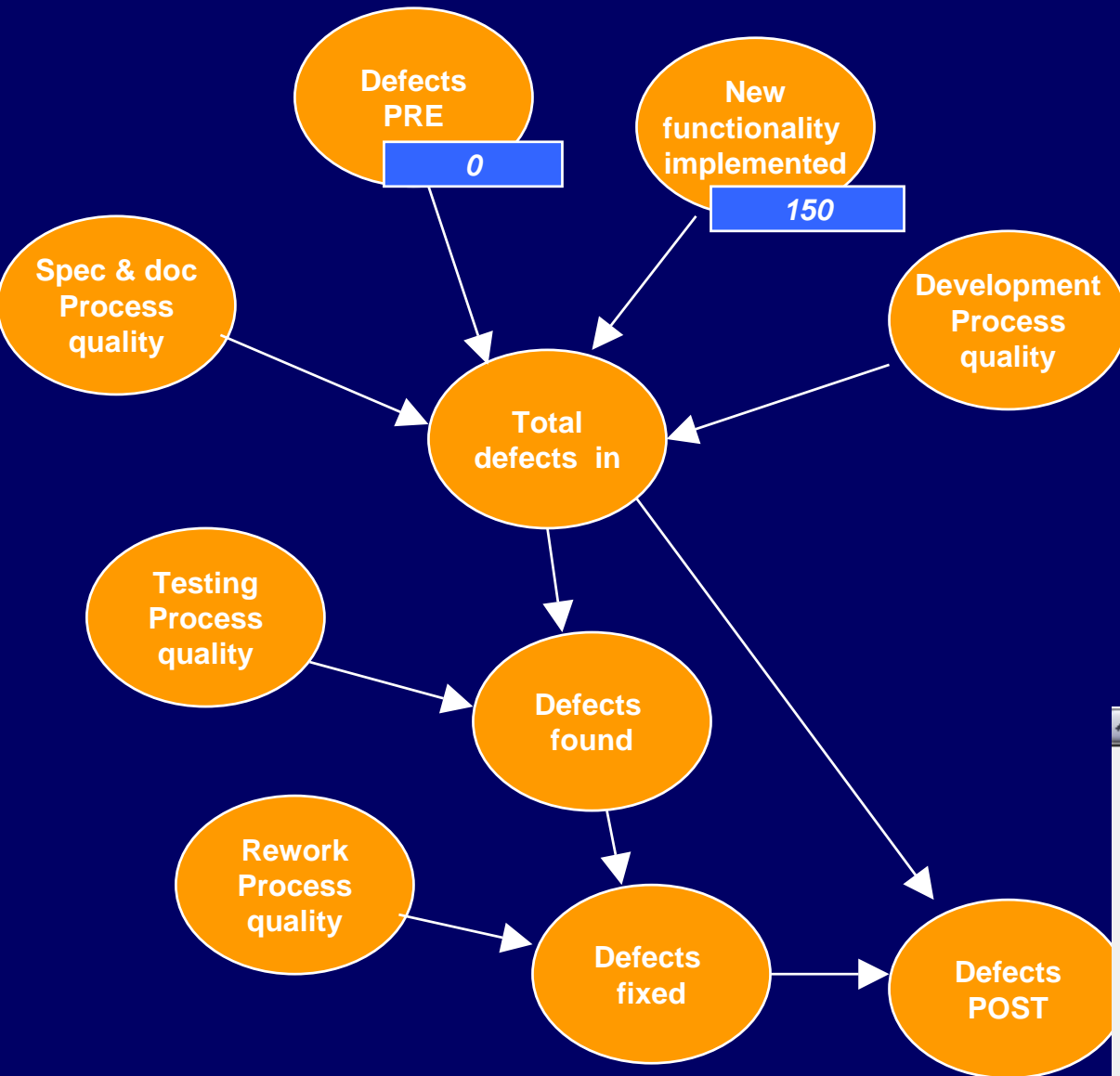
Regression models....?



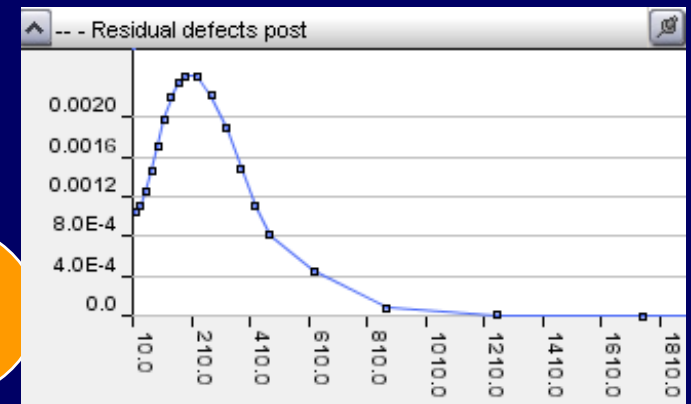
Solution: causal models (risk maps)



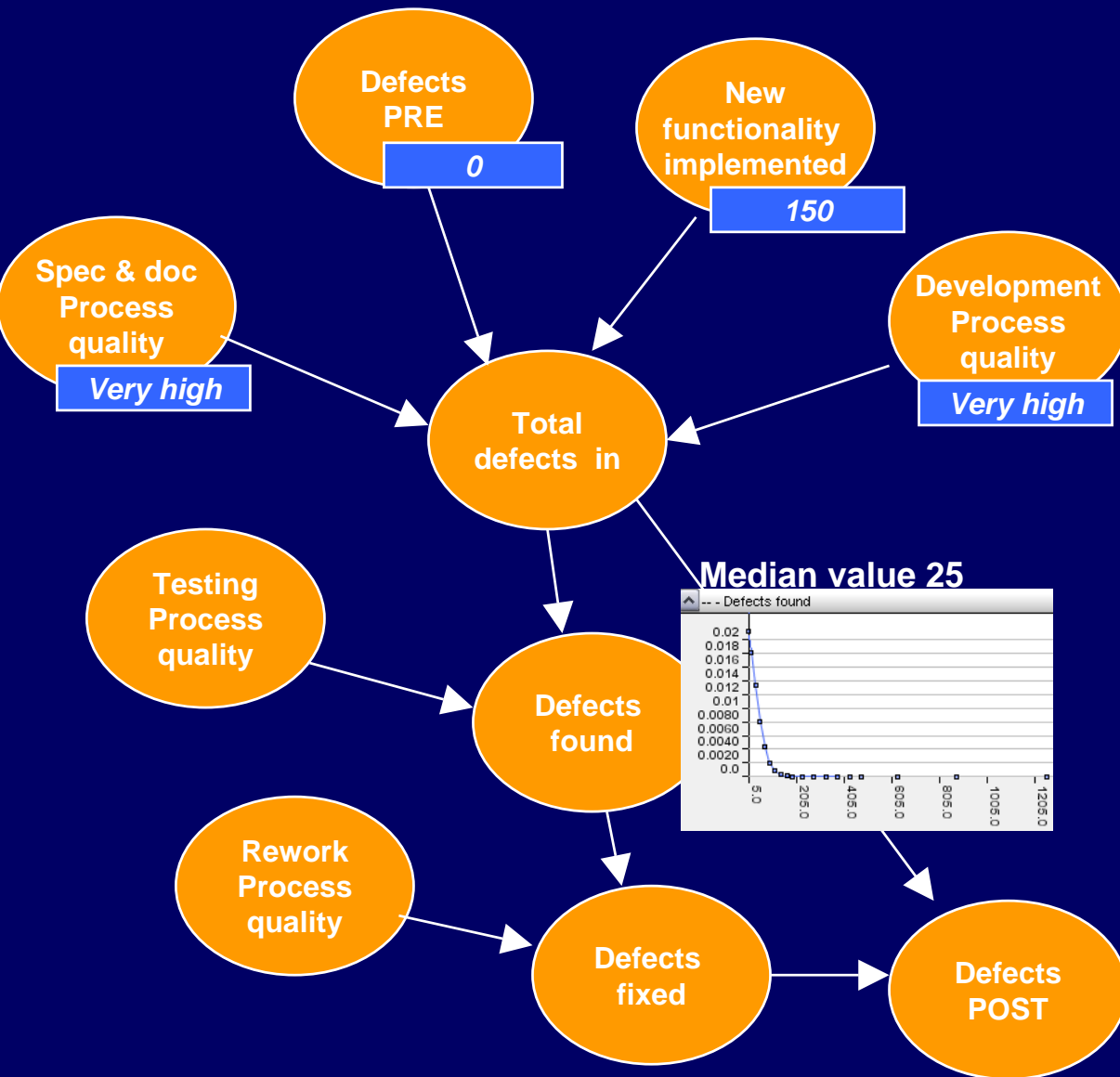
Running the defects risk map



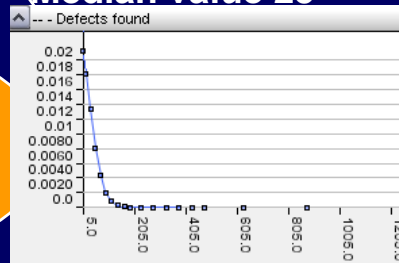
Median value 257



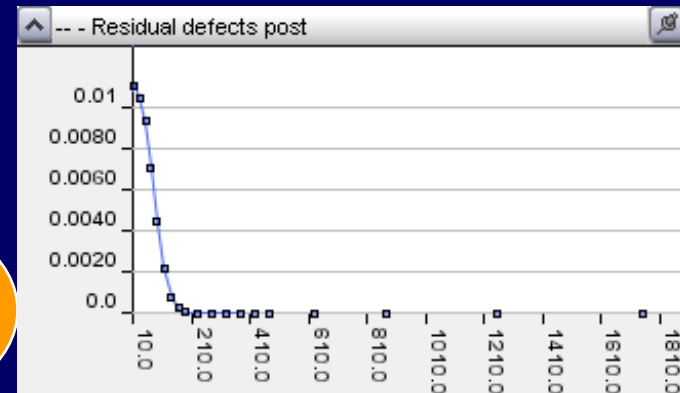
High quality development



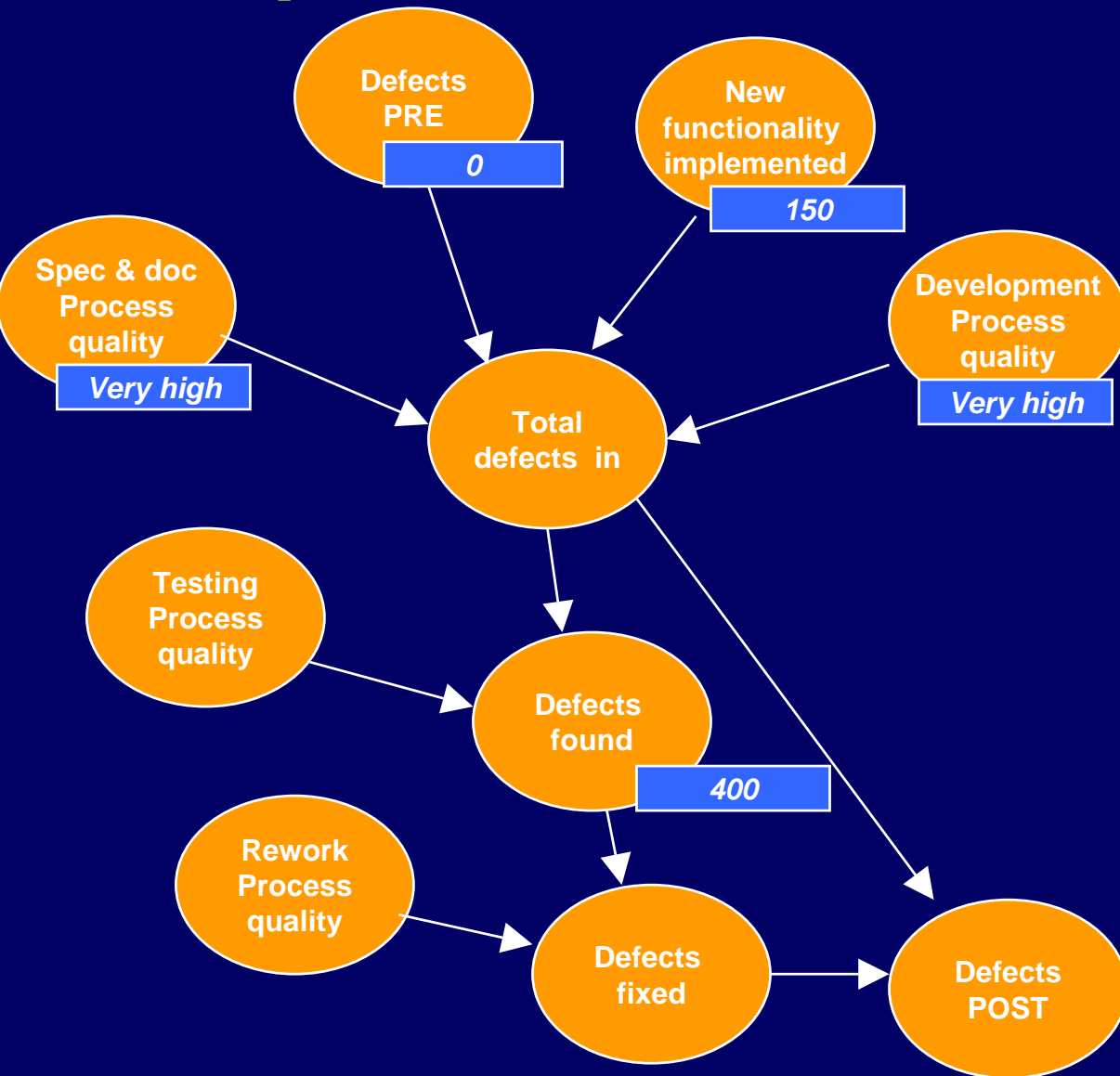
Median value 25



Median value 40

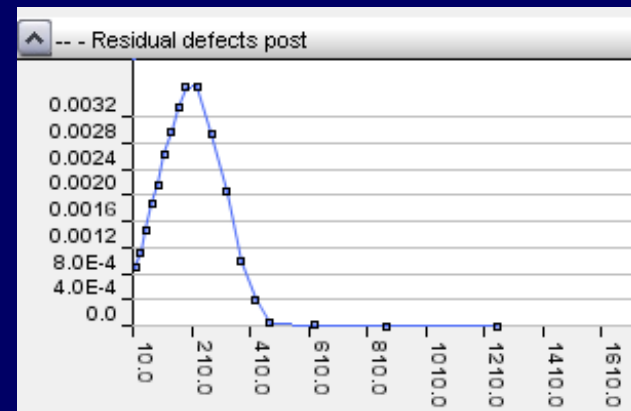


... but suppose more than expected defects found in testing

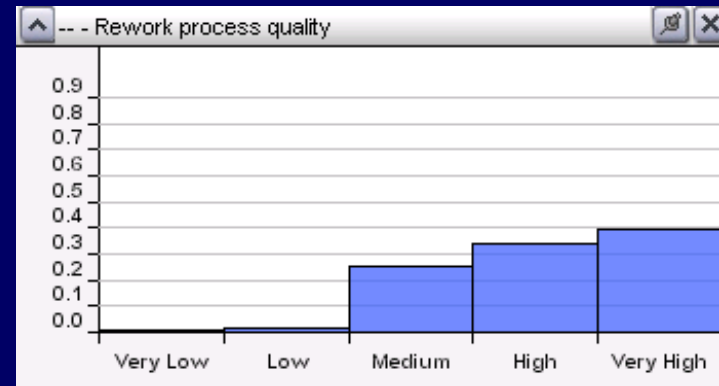
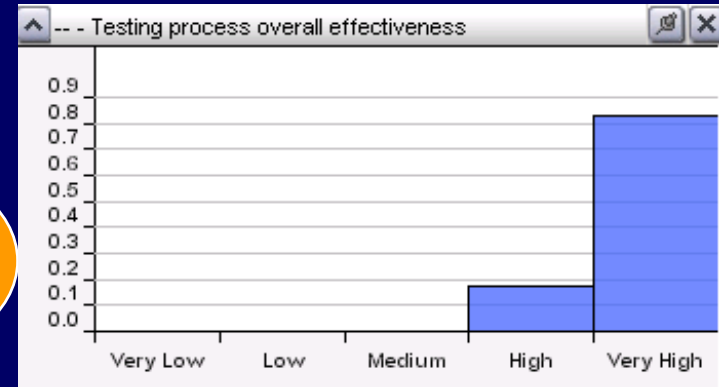
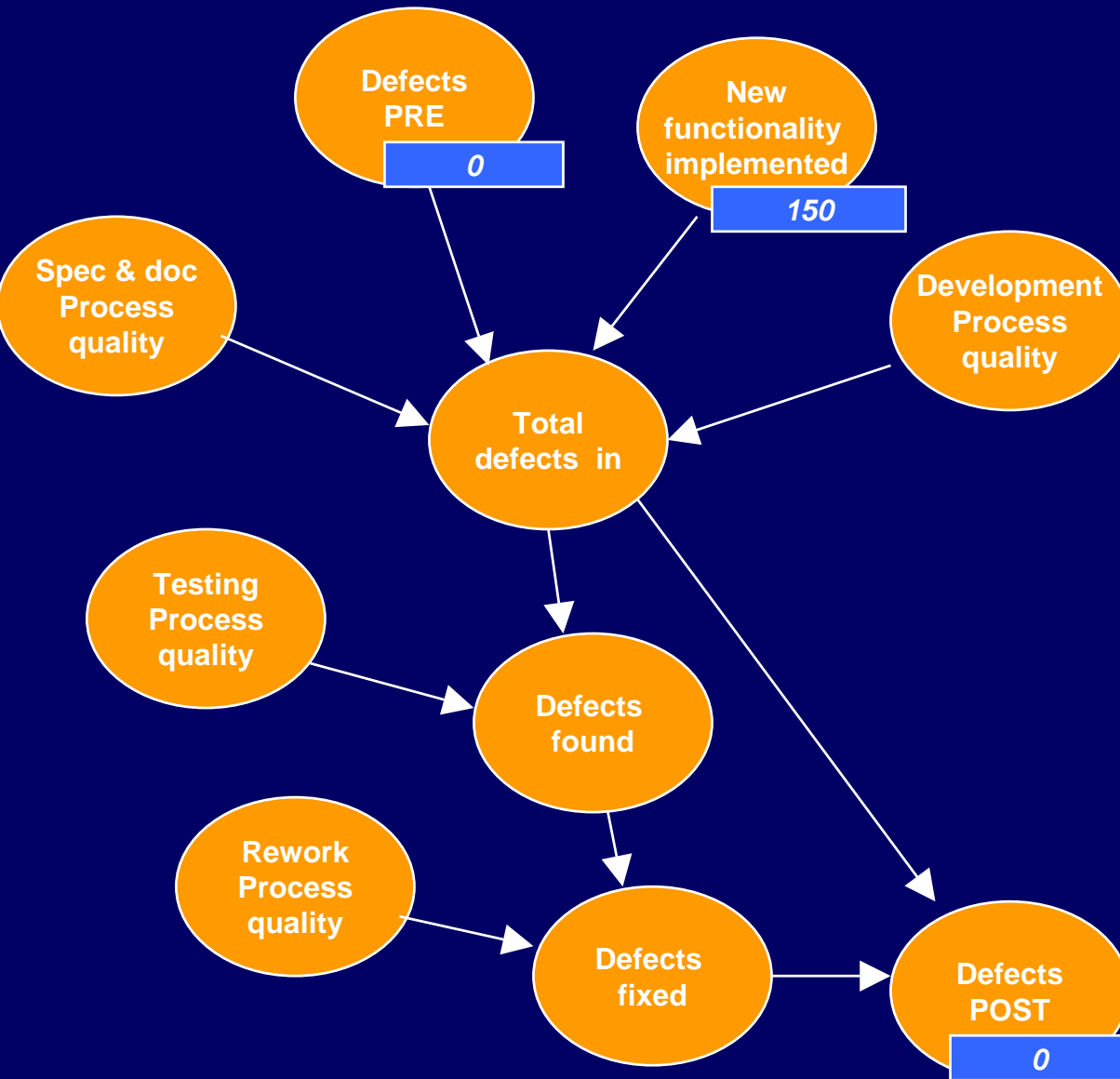


So hard information about testing has 'overturned' evidence about the high quality process

Median value 204



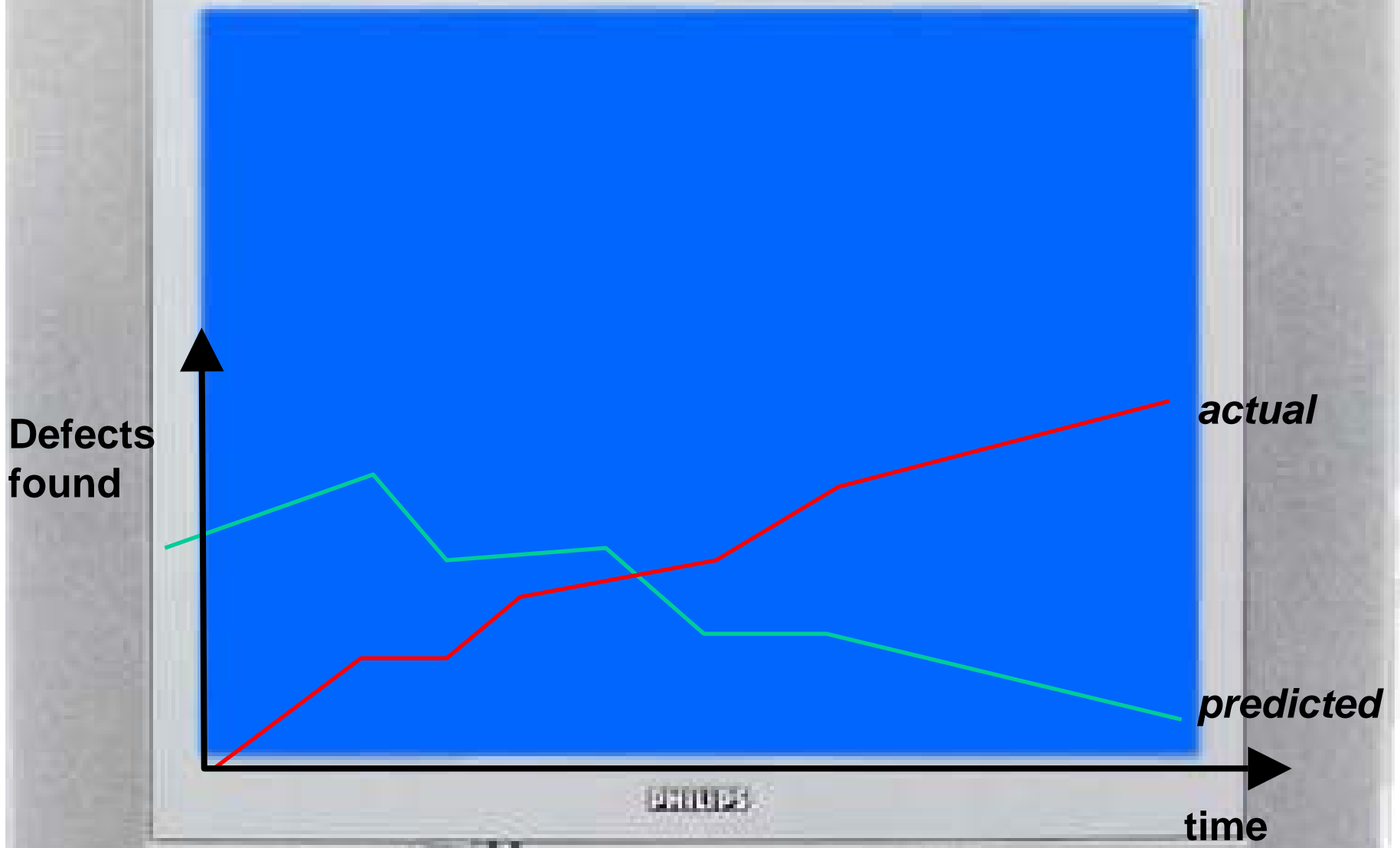
How good must your testing and rework be to get 0 residual defects?



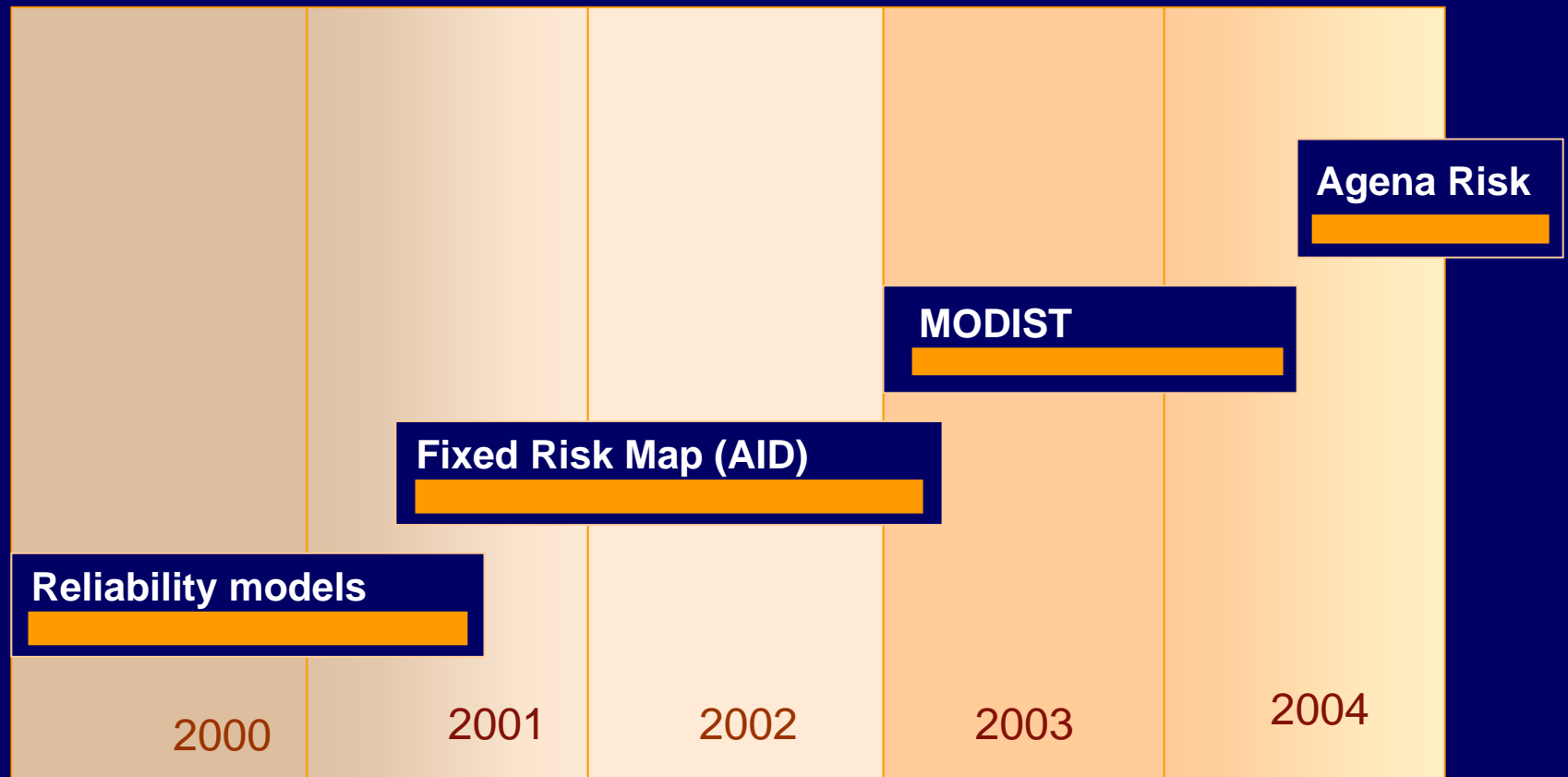
What's special about this approach?

- **Structured**
- **Visual**
- **Robust**

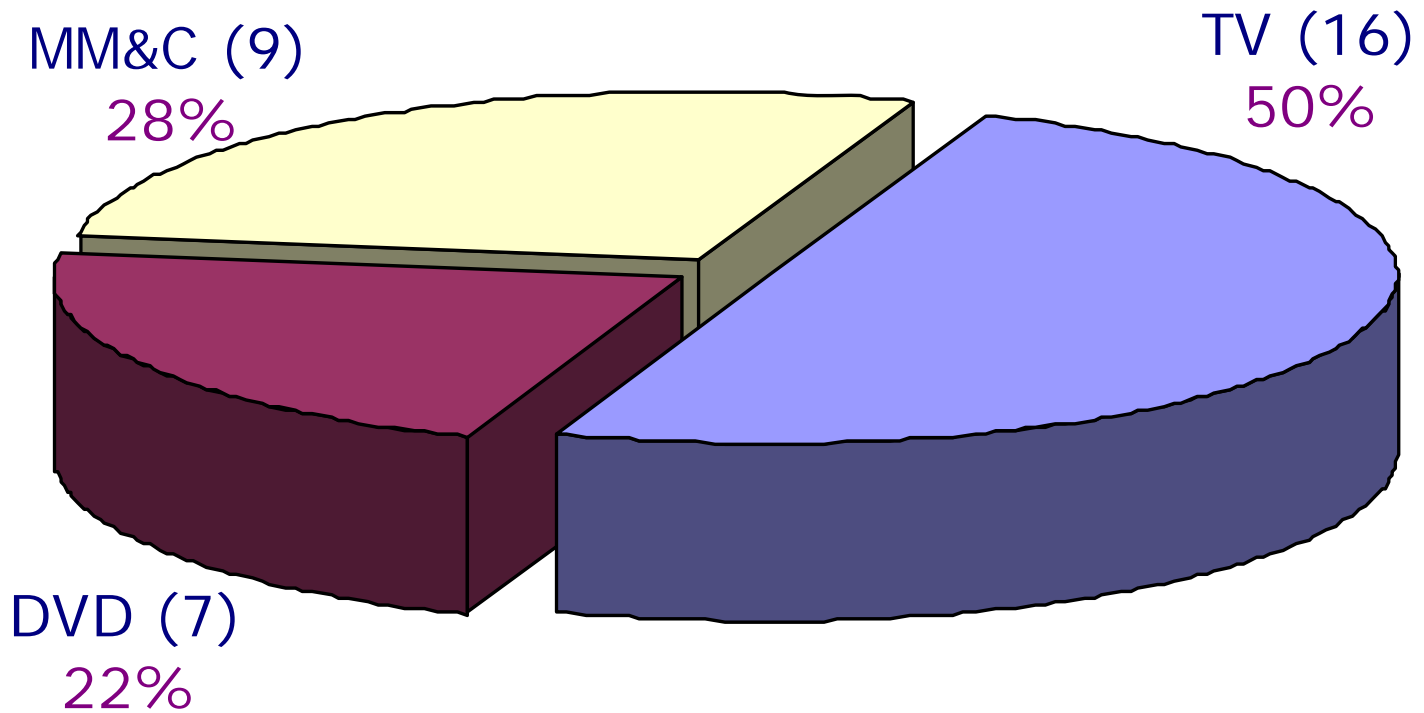
The specific problem for Philips



Background to work with Philips



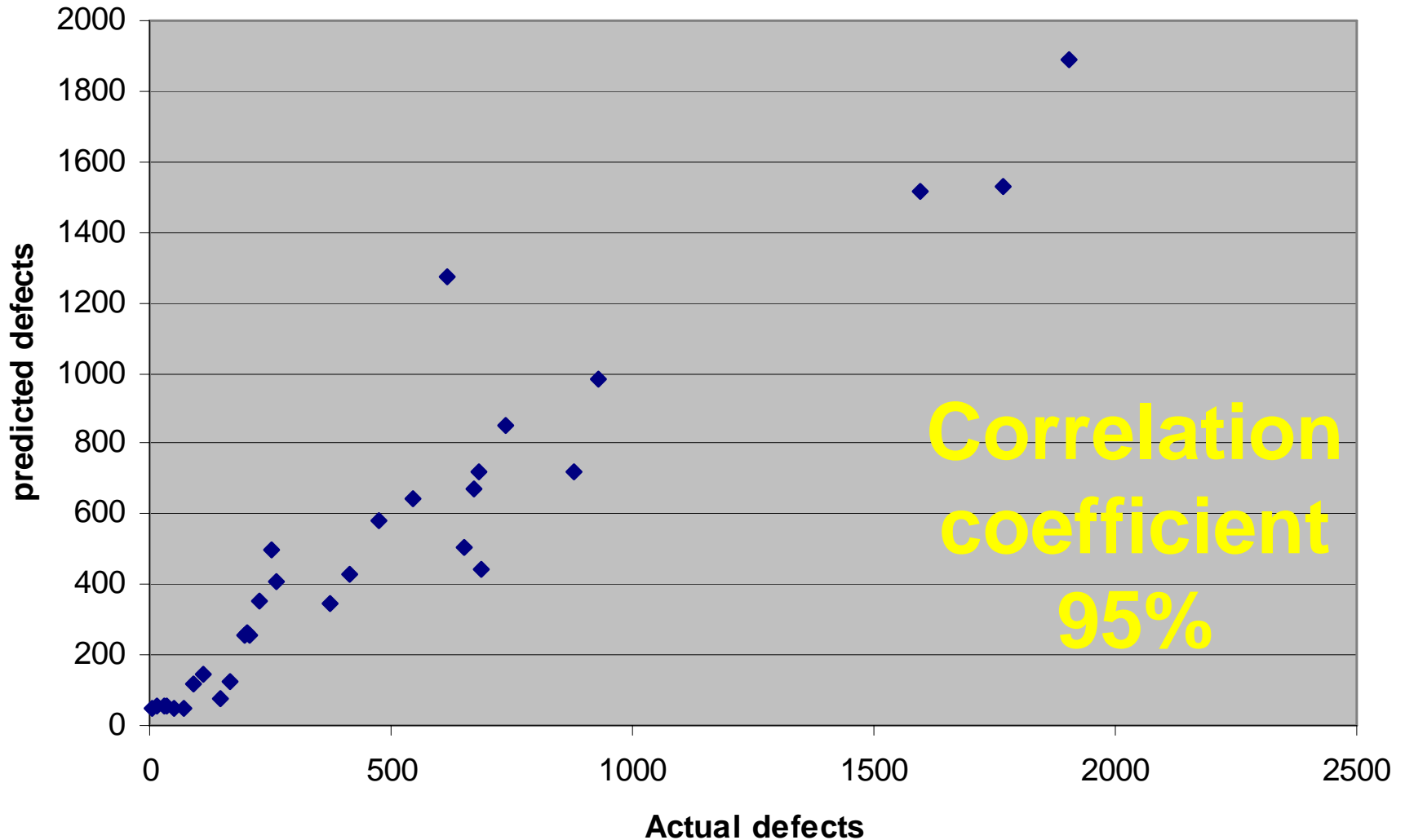
Projects in the trial



Factors used at Philips

- Existing code base...
- Complexity and management of new requirements ...
- Development, testing, rework, process ...
- Overall project management ...

Actual versus predicted defects



Validation Summary (Philips' words)

“Bayesian Network approach is innovative and one of the most promising techniques for predicting defects in software projects”

“Our evaluation showed excellent results for project sizes between 10 and 90 KLOC”

“Initially, projects outside this range were not within the scope of the default model so predictions were less accurate, but accuracy was significantly improved after standard model tailoring”

“AgenaRisk is a valuable tool *as is*”

Specific benefits

- **Accurate predictions of defects at different phases**
- **Know when to stop testing**
- **Identify where to allocate testing**
- **Minimise the cost of rework**
- **Highlight areas for improvement**
- **Use out of the box now if you have no data**
- **Approach fully customisable**
- **Models arbitrary project life-cycles**

Summary

- Risk maps – the way forward
- Validation results excellent

...And

You can use the
technology NOW

www.agenarisk.com

