Defect Removal Effectiveness

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Defect Removal Effectiveness (or efficiency as used by some writers) is calculated:

$$DRE = \frac{\text{Defects removed during a development phase}}{\text{Defects latent in the product at that phase}} \times 100\%$$

Since the latent defects in a software product is unknown at any point in time, it is approximated by adding the number of defects removed during the phase to the number of defects found later (but that existed during that phase).

For example, assume that the following table reflects the defects detected during the specified phases and the phase where those defects were introduced.

	Phase Introduced		
Phase Detected	Requirements	Design	Coding/Unit Test
Requirements	10	---	---
Design	3	18	---
Coding	0	4	26
Test	2	5	8
Field	1	2	7

The Defect Removal Effectiveness for each of the phases would be as follows:

Requirements DRE = 10 / (10+3+0+2+1) x 100% = 63%

Design DRE = (3+18) / (3+0+2+1+18+4+5+2) x 100% = 60%

Coding DRE = (0+4+26) / (0+2+1+4+5+2+26+8+7) x 100% = 55%

Testing DRE = (2+5+8) / (2+1+5+2+8+7) x 100% = 60%

Defect Removal Effectiveness can also be calculated for the entire development cycle to examine defect detection efforts before the product is released to the field. According to Capers Jones, world class organizations have Development DRE greater than 95%.[1]

Development DRE = (Pre-release Defect) / (Total Defects) x 100% =

(10+3+2+18+4+5+26+8) / (10+3+2+1+18+4+5+2+26+8+7) x 100 = 88%

The longer a defect exists in a product before it is detected, the more expensive it is to fix. Knowing the DRE for each phase can help an organization target its process improvement efforts to improve defect detection methods where they can be most effective. Future DRE measures can then be used to monitor the impact of those improvement efforts.

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1. Jones, Capers, Keynote Address, 5th International Conference of Software Quality, Austin, TX, 1995.