Assignment – 5 (Part 1)

1. Calculate the defect removal rate for every phase

Defect removal rate = No of defects removed / 120KLOC

Phase	Number of defects removed	Defect Removal Rate
Requirement	120	***1.00***
Analysis	73	***0.61***
Design	282	***2.35***
Coding	557	***4.64***
Unit testing	326	***2.72***
Integration testing	125	***1.04***
System testing	87	***0.73***
Field	11	***0.09***

2. Calculate the defect injection rate for every phase

Defect injection rate = no. of defects injected / 120 KLOC

Phase	Number of injected defects	Defect injection rate
Requirement	412	***3.43***
Analysis	181	***1.51***
Design	403	***3.36***
Coding	564	***4.70***
Unit testing	6	***0.05***
Integration testing	5	***0.04***
System testing	6	***0.05***
Field	4	***0.033***

3. Calculate the defect escape rate for every phase

Defect escape rate = Number of defects escaped / 120 KLOC

Number of defects escaped = Number of defects injected + Number of defects escaped from prior phase – Number of defects removed

Phase	Total defects injected (A)	Total no of defects escaped from prior phase (B)	Total no of defects removed (C)	Total no of defects escaped (A+B-C)	Defect escape rate
Requirement	412	0	120	292	***2.43***
Analysis	181	292	73	400	***3.33***
Design	403	400	282	521	***4.34***
Coding	564	521	557	528	***4.40***
Unit testing	6	528	326	208	***1.73***
Integration testing	5	208	125	88	***0.73***
System testing	6	88	87	7	***0.06***
Field	4	7	11	0	***0***

4. Calculate the overall defect removal effectiveness.

Overall defect removal effectiveness = [(1 – (Defects in field / Total defects)] * 100

Overall defect removal effectiveness = (1 – 11/1581) * 100 = **99.30%**

5. Which phase is the most effective in removing defects? Explain.

Defect removal effectiveness = No. of defects found / no. of defects injected from previous phase + No. of defects injected

Phase wise defect removal effectiveness

Requirement = 120 / 412 = 29.12%
Analysis = 73 / (181+292) = 15.43%
Design = 282 / (403+400) = 35.11%
Coding = 557 / (521+564) = 51.33%
Unit test = 326 / (528+6) = 61.04%
Integration test = 125 / (208+5) = 58.68%
System test = 87 / (88+6) = 92.55%
Field = 11 / (7+4) = 100%

Unit test phase is the most effective in removing defects. **System test has 92.55% effectiveness but number of defects are also less** as maximum defects were found during

unit test phase prior to it. In this case, most of the defects escaped from previous frontend phases like requirement, analysis, design and coding are found and removed in the unit testing phase. Unit test phase has defect removal efficiency of 59.38% as per Dunn's formula while next best is coding phase with dre of 51.33%. From coding phase 528 defects were escaped into unit testing phase but only 208 defects could escape from unit testing phase.

6. Do you think reviews and inspections were effective? Explain.

Yes, inspections and reviews were effective, as those phases removed 1032 defects from 1581 total found defects. That is **65.28% defect removal effectiveness** for review and inspection. Inspections and reviews helped to minimize the defect before backend phases.

Defect removal during review and inspections will also be cost effective way for the project. As defects are not injected into backend phases from where defect removal becomes costly as number of iterations for DSLC increases, which will take more time and time is money.

7. If the number of defects originated in design phase increased by 15% and defects detected in design review increased by 60%, would these changes increase or decrease the defects escaped to the coding phase? Explain your answer in detail (present data to support your answer).

For example, initially defects originated in design phase are 200 and defects detected are 100. Now, if defects originated in design phase are increased by 15%, it will become 230. Defects detected in design phase are increased by 60% it will become 160. Initially defects escaped were 200 – 100 = 100, after increase defects escaped are 230 – 160 = 70. If defects detected are increased by 60% as compared to defects originated are increased by 15% then that would **decrease the defects escaped to the coding phase**.

In this case, if defects originated in design phase increased by 15% then it becomes 465. If defects detected in design phase are increased by 60% then it becomes 452.

On basis of new data, defect escaped into coding phase will decrease from 521 to 412. Thus, it will decrease the defects escaped to the coding phase.