The Cost of Poor Quality Nobody Puts on the P&L

> A 3% defect rate on 100,000 units a year does not show up as a line item anywhere. Priced out with the standard prevention-appraisal-failure framework, it is $99,000 a year, and $46,000 of it goes away by cutting the rate to 1%.

A 3% defect rate does not look alarming on a quality scorecard. It is easy to read as "97% right," which sounds fine. What that framing leaves out is the dollar cost of the 3%, and that cost rarely appears anywhere as a single number, because it is scattered across rework labor, scrap material, warranty claims, and returns handling, each booked to a different cost center. Adding it up in one place is usually the first time anyone sees the real number.

A worked example: 100,000 units a year at a 3% defect rate

Take 100,000 units a year at a 3% defect rate, $8 rework cost per defect, $15 external failure cost per defect (returns and warranty), plus $20,000 a year already spent on inspection (appraisal) and $10,000 on prevention. That is 3,000 defective units a year: $24,000 in internal rework cost, $45,000 in external failure cost, plus the $30,000 already spent on appraisal and prevention. Total cost of quality: $99,000 a year, none of it visible as a single line anywhere in a typical chart of accounts.

What cutting the defect rate actually recovers

Target a 1% defect rate instead of the current 3%, holding appraisal and prevention spend the same. Total quality cost at the lower defect rate drops to $53,000 a year. The improvement value, the amount recoverable by hitting the lower rate, is $46,000 a year, a number that only exists because both the current and the target state were priced out with the same framework.

Why prevention spend is part of the same number, not a separate budget line

The Prevention-Appraisal-Failure framework treats inspection and prevention spend as quality cost too, not just the visible failures. That matters because it keeps the comparison honest: a program that raises prevention spend to lower the defect rate is not automatically "adding cost," it is trading one part of the quality cost total for a smaller amount somewhere else. Looking only at failure cost and ignoring what is already being spent to prevent failures overstates how much room there is to improve for free.

This is a different question from a single defect's scrap cost

Pricing one bad unit's scrap cost is a narrower, simpler question, useful for a specific defect investigation. The cost of poor quality is the aggregate across every defect over a year, which is what actually shows up as margin erosion even though no single defect looks expensive in isolation. Both numbers matter, they answer different scopes of the same underlying problem.

> **Key takeaway.** A defect rate that reads as "mostly fine" on a scorecard can still be a six-figure annual cost once rework, external failure, and the money already spent on prevention and inspection are added into one number.

Assumptions

- Internal failure cost (rework) and external failure cost (returns, warranty, goodwill) are both counted, external failure cost per defect is typically higher because it includes reputational and logistics cost beyond the rework itself.

Sources

- Prevention-Appraisal-Failure (PAF) quality cost framework, standard cost-of-quality accounting model

Frequently asked questions

Why does external failure cost more per defect than internal rework?

A defect caught internally costs the rework labor and material to fix. A defect that reaches a customer costs that plus returns handling, warranty processing, expedited replacement, and reputational cost that does not show up on an invoice but shows up eventually in lost repeat business. The external figure in this framework is meant to capture that fuller cost, not just the direct handling expense.

Is the improvement value the same as the budget available for a quality project?

It is the annual savings ceiling, not a project budget by itself. A quality improvement project's ROI still needs its own cost and payback period checked against this savings figure (see Defect Reduction ROI), since a project that costs more than a reasonable number of years of savings to implement may not pay back within a useful window even with strong annual savings.

What if the target defect rate equals the current rate?

The improvement value comes out to zero, correctly, since there is nothing to recover if nothing is changing. This is treated as a valid input, not an error, since it is a reasonable way to check the current-state cost number on its own.

Operations Decisions is a set of transparent decision engines for physical operations, not a guarantee of any outcome. This guide is educational.