Repair or Replace Equipment Analysis

How-to guide: what the workbook does, how to use it and what every number means. mfgcalcs.com

Repair or Replace Equipment Analysis

Compare repairing and keeping an ageing machine with replacing it: year-by-year cost, present value, equivalent annual cost, break-even year and simple payback.

For: Maintenance and reliability managers, plant engineers and finance teams deciding whether to repair or replace a machine.

Version 1.0.0 · updated 25 November 2026

Quick start

1. On Setup, type your company name, currency, discount rate and what an hour of downtime costs you.
2. On Comparison, describe the asset, then enter the repair needed now and the old asset's yearly maintenance, downtime, energy and ageing.
3. Enter the replacement: price, installation, trade-in, its yearly maintenance, downtime and energy, and both end values.
4. On Year by Year, keep one row per year of the horizon and type any planned overhaul in the year it falls.
5. Open the Dashboard: the net present value of replacing, both equivalent annual costs, the break-even year and the simple payback.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Your company, currency, the discount rate and what an hour of downtime costs.
Comparison	The asset, the repair-and-keep option, the replace option and a simple payback screen.
Year by Year	One row per year from year 0: the cost of each option, present values and cumulative costs.
Dashboard	Repair and keep or replace: present-value cost, equivalent annual cost, break-even year and payback.
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.
About MFG Calcs	Everything MFG Calcs offers, free: calculators, templates, tariff tools, data and the Calkee AI helper.

What each number means

Quantity	How it is calculated	Units

Quantity	How it is calculated	Units
Year-1 cost of each option	Maintenance + downtime hours x downtime cost per hour + energy, for the old and the new asset.	currency/yr
Old asset: maintenance and downtime in year t	Year-1 value x (1 + yearly increase)^(t - 1).	currency
Replacement: maintenance in year t	Year-1 value x (1 + yearly increase)^(t - 1); downtime and energy stay at their year-1 values.	currency
Total by year	Year 0: the repair now (keep) or price + installation - trade-in (replace). Later years: maintenance + downtime + energy. Plus planned work; less the end value in the last year.	currency
Present value	Total x 1 / (1 + discount rate)^year; each option's PV cost is the sum over the years.	currency
NPV of replacing	PV cost of repairing and keeping - PV cost of replacing; at or above zero, replacing costs less.	currency
Equivalent annual cost	PV cost x r / (1 - (1 + r)^-n), with r the discount rate and n the horizon in years (PV / n when r is 0).	currency/yr
Break-even year	The first year in which the cumulative cost of replacing is at or below that of keeping.	year
Simple screen	Extra investment = price + installation - trade-in - repair now; net annual savings = year-1 cost of keeping - of the replacement; payback = investment / savings; horizon net benefit = horizon x savings - investment; ROI = benefit / investment.	currency, years, %

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Ostler Creek Manufacturing, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

Repair or Replace Equipment Analysis

Repair and keep or replace: present-value cost, equivalent annual cost, break-even year and payback.

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Air compressor C-2, 100 hp rotary screw: 8-year horizon at a 10.0% discount rate. Money in USD.

NPV OF REPLACING (USD)	ON THESE FIGURES	REPLACING AHEAD FROM YEAR	SIMPLE PAYBACK (YEARS)
174,260	**Replace**	**3**	**2.51**
Replace at or above 0	Lower present-value cost wins	First year its cumulative cost is lower	Year-1 costs held constant
On target			



