

FSME LOGIC

Unplanned Downtime Cost Reference Sheet

Industry-Average Figures for Internal ROI Calculations and Management Presentations

Important note on these figures: All cost ranges below are estimated industry averages compiled from publicly available maintenance cost studies, engineering literature, and industry association reports. They are provided as a reference baseline for internal financial modeling and management presentations only. Actual costs at your facility will vary based on equipment type, geography, labour rates, parts availability, and operational conditions. Do not use these figures as the sole basis for capital allocation decisions.

Section 1 — Reactive vs. Planned Repair Cost Comparison

The most significant cost driver in unplanned maintenance is not the repair itself — it is the emergency premium applied to parts, labour, and the extended downtime caused by unplanned scheduling.

Equipment Type Reactive Failure Cost (Est.) Planned Repair Cost (Est.) Multiplier			
Hydraulic Systems (brakes, steering, lifts, presses)	\$50,000 – \$150,000	\$5,000 – \$8,000	10–20x
Commercial Fleet Drivetrain (transmissions, differentials, axles)	\$15,000 – \$60,000	\$2,000 – \$6,000	7–10x
Refrigeration & HVAC (compressors, condensers)	\$5,000 – \$25,000+	\$200 – \$800	10–30x
Bearings & Rotating Equipment (motors, fans, pumps, spindles)	\$2,000 – \$15,000+	\$50 – \$400	20–40x
Industrial Compressors & Pumps (process equipment)	\$8,000 – \$40,000	\$500 – \$3,000	10–15x
Industrial Bearings & Gearboxes (heavy manufacturing)	\$10,000 – \$80,000	\$500 – \$2,000	15–40x

Section 2 — Hourly Downtime Cost by Sector

These figures represent the approximate cost of one hour of unplanned production downtime, including lost revenue, idle labour, and downstream impact. Planned downtime during scheduled maintenance windows typically costs 5–15% of these figures.

Industry Sector Low Estimate (\$/hr) High Estimate (\$/hr) Key Cost Drivers			
Automotive Manufacturing	\$22,000	\$50,000+	Assembly line stoppage, idle workforce, missed delivery penalties
Oil & Gas Pipeline	\$5,000	\$25,000+	Throughput loss, regulatory compliance, safety mobilization
Commercial Trucking / Logistics	\$1,000	\$5,000	Missed deliveries, roadside recovery, expedited repair premiums
Commercial Refrigeration / Cold Chain	\$500	\$15,000+	Product spoilage, food safety compliance, emergency callout
Construction / Mining Equipment	\$2,000	\$30,000	Site stoppage, crew standby, expedited equipment rental
Food & Beverage Processing	\$3,000	\$20,000	Batch loss, cleaning and sanitization restart, compliance holds
Small Commercial Fleet (1–50 units)	\$300	\$2,000	Route disruption, emergency subcontracting, parts premiums

Section 3 — Hidden Costs Frequently Excluded from Estimates

Standard maintenance cost tracking typically captures direct repair costs only. The following categories are frequently untracked but represent a significant portion of the true total failure cost:

Hidden Cost Category Description Typical Impact		
Secondary Damage	A bearing failure causing gearbox damage; a hydraulic failure causing seal damage across the system.	40–80% of primary repair cost added
Emergency Labour Premium	Overtime rates for technicians called in outside regular hours. Contractor emergency call-out fees.	1.5–3x standard labour rate
Expedited Parts Shipping	Rush orders for non-stocked parts. Air freight vs. standard ground. Availability premium on critical components.	200–500% of standard parts cost
Downstream Production Impact	Equipment feeding a failure point stops. Inventory backlogs build. Customer delivery commitments missed.	Often larger than repair cost itself

Root Cause Investigation	Engineering time spent determining why the failure occurred. Regulatory incident reporting if applicable.	\$500 – \$5,000 per incident
Management and Documentation	Internal reporting, procurement processing for emergency POs, insurance claim documentation.	4–12 hours per major incident

Section 4 — The Green Dashboard Fallacy (Reference Summary)

Standard Threshold Monitoring	FSME Logic Physics-Based Detection
Triggers when amplitude exceeds a preset threshold. Alarm fires when damage is already occurring.	Detects structural stress accumulation and signal entropy degradation weeks before amplitude changes. Alarm fires before damage begins.
Result: Reactive maintenance. Emergency response after the crash.	Result: Planned maintenance. Intervention before the crash.

Benchmark Results — FSME Logic on Public Datasets	ESA spacecraft telemetry: 9-month detection lead time, 0 false positives. NASA C-MAPSS (509 turbofans): 78% fleet detection rate, avg 126-cycle warning. NASA Curiosity Rover: 6.3-hour warning, 382 steps before official failure label. CWRU Bearing Benchmark: 100% fault classification across 9 types, 3 severity levels.
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Sources: Cost figures are estimated industry averages from publicly available maintenance engineering literature including SMRP benchmarking studies, ARC Advisory Group reports, and industry maintenance cost surveys. All figures are for reference only and should be adjusted to your specific operational context. FSME Logic benchmark results are from public datasets (NASA C-MAPSS, ESA-ADB, CWRU) and are independently reproducible.