FAILURE CAUSES

Overload

Fatigue Cracking

Corrosion-assisted Cracking

Creep

Wear

Chemical Reaction

PREVENTIVE MAINTENANCE
(avoiding component failure should reduce λ)

Periodic Care (e.g., changing oil)

Testing and Response

Replacement and Repair Before Failure

Monitoring and Response Repair, Replacement, Realignment

REPAIR

Take component out of service for repair/replacement

Fix What's Broken

    Reactive

    Prepared

        Parts available   { Stored nearby
                                        Available via rapid delivery

        Teams trained

        Work planned   { Quick execution
                                   Accurate feedback

        Tools available

Replace What's Broken

    Design for quick replacement   { Modules
                                                  Good work space

    Store components prepared for quick replacement

MAINTENANCE STRATEGIES[*]

Maintenance Policy	Corrective Maintenance	Preventive Maintenance
Run to failure	Replace upon failure	None
Age-dependent replacement	Replace upon failure	Replacement after interval, τ, in service
"Block" replacement	Replace upon failure	Replace at fixed times, $k\tau$; $k = 1, 2, ...$
Minimal repair with "Block" replacement	Repair minimally upon failure	Replace at fixed times, $k\tau$; $k = 1, 2, ...$
Periodic testing (for latent defect detection)	Replace or repair upon test failure	Replace at fixed times, $k\tau$; $k = 1, 2, ...$
Monitoring-based repair or replacement	Replace or repair upon $P(\lambda\delta t) > P^*$ or upon failure	None

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[*] Vatn, et al., "Approaches to Maintenance," 54, p. 241, 1996