

Committee 140

Life Cycle Performance & Cost

Paul Tourney - Chair

Peter DeNicola

“You Call It Sustainability, We Call It Concrete Repair”

Committee 140 - Life Cycle Performance & Cost

MISSION

Provide industry guidance for decisions based on both the service extension and economic impact of concrete repairs.

GOALS

Develop technical guideline on managing the serviceability of concrete structures through a “cradle to grave” approach using preventative maintenance systems and quality concrete repairs.

Committee 140 - Life Cycle Performance & Cost

Current Membership:

Paul Tourney

Pete DiNicola

Dale Campbell

Jason Dunster

Kevin Earley

Eric Edelson

Greg Gilmor

Fred Goodwin

Joshua Hollis

Graeme Jones

Richard McGuire

Mike Parker

Chris Perego

Matt Sherman

Consulting Members:

Frank Apicella

James McDonald

Jessi Meyer

Committee 140 - Life Cycle Performance & Cost

Expanded Objectives:

- Use excellent work efforts of other ICRI committees.
- Develop tools for owners and engineers to promote and justify better concrete repairs.
 - Decision Tree on “Cradle to Grave” of structures and the maintenance options.
 - Guidelines for use of the decision tree system.
 - Provide a series of project case studies for demonstration of SLP / LCCA for optimal management of concrete structure assets.
- Liaison with ACI and ISO Committees to build consensus.

Importance of Concrete Repair Sustainability

Type of Structure	#New	#Existing	Grade
Highway Bridges	1,000	600,000+	C
Highway Roads	X	100X	D-
Parking Garages	400	25,000+	C
Dams	10	4,000	D

Importance of Concrete Repair Sustainability

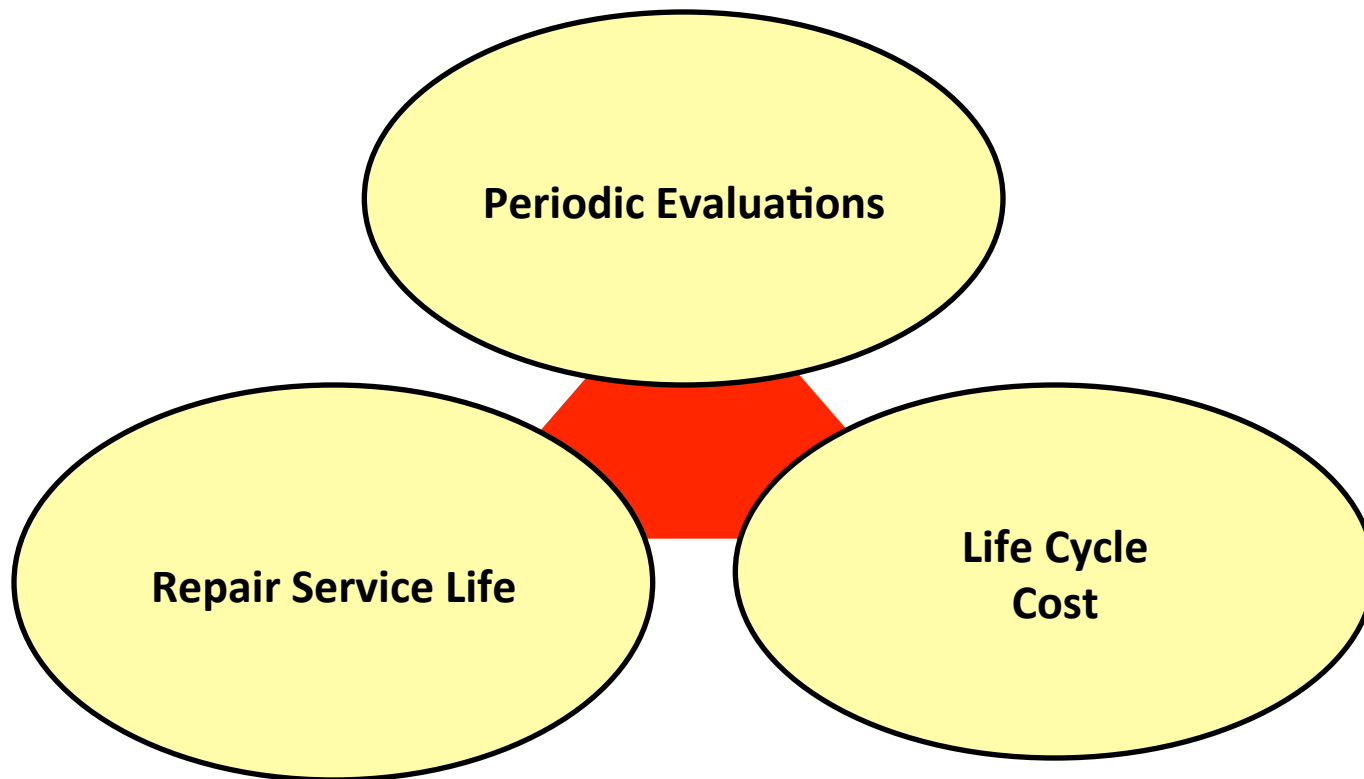
Type of Structure	#New	#Existing	Grade
Highway Bridges	1,000	600,000+	C
Highway Roads	X	100X	D-
Parking Garages	400	25,000+	C
Dams	10	4,000	D

1 Build new structures to last longer!

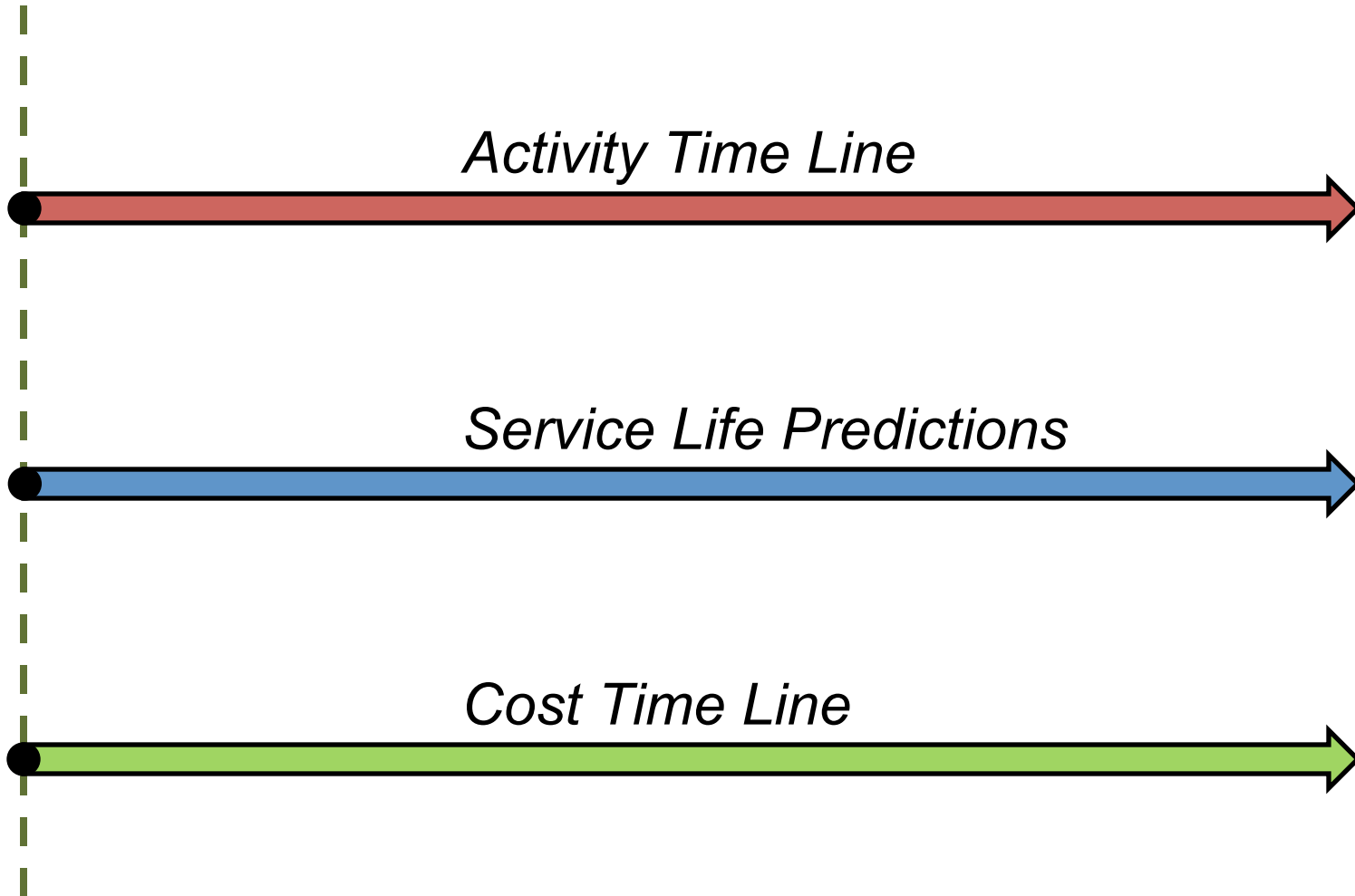
2 Maintain and repair existing structures to significantly extend the time to subsequent repair.

The backlog numbers are against us!!

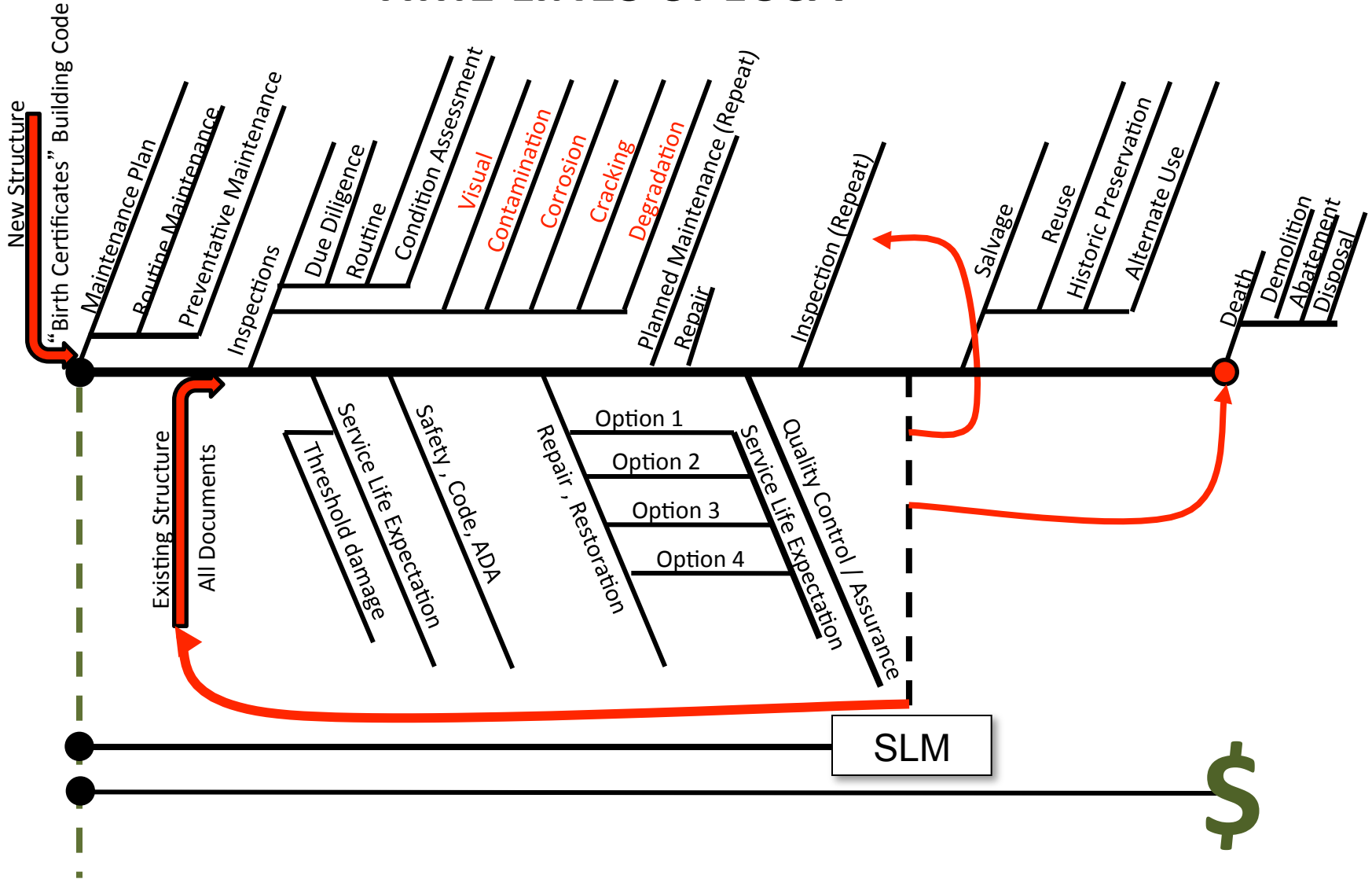
Balance of Asset Management of Existing Structures:



TIME LINES of LCCA



TIME LINES of LCCA



Life Cycle Costing

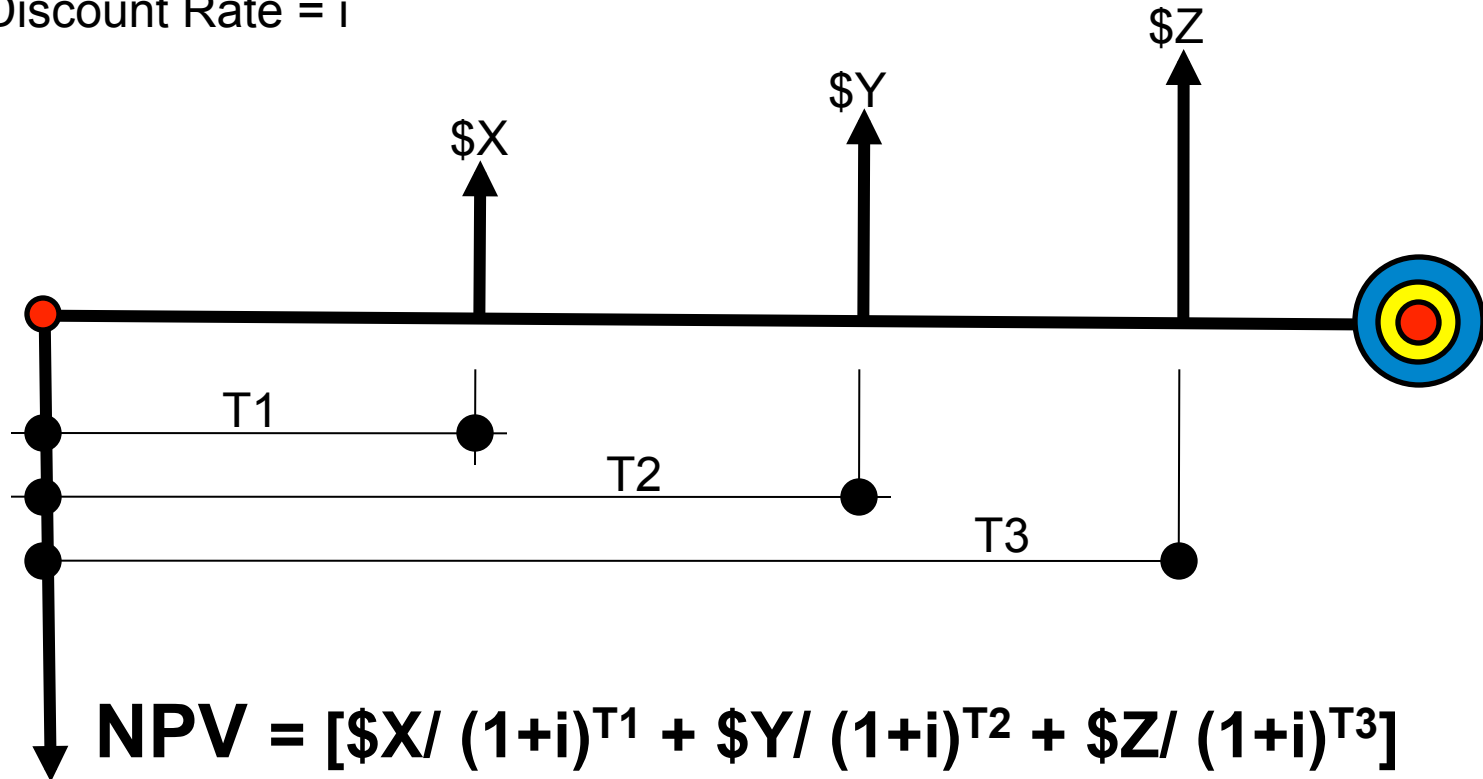
Net Present Value (NPV)

**NPV = Today Cost / (1 + Effective Interest Rate (i)) ** (years from
~~today~~)**

- What is the \$\$\$ needed to put away today to take care of facility for the expected service life?
- Related to the opportunity cost. General rules.
 - Dollars spent in the future is lower cost than dollars spent today.
 - Higher the interest rate the greater the premise.
 - Dollars NOT spent today will result in high Life Cycle Costs.

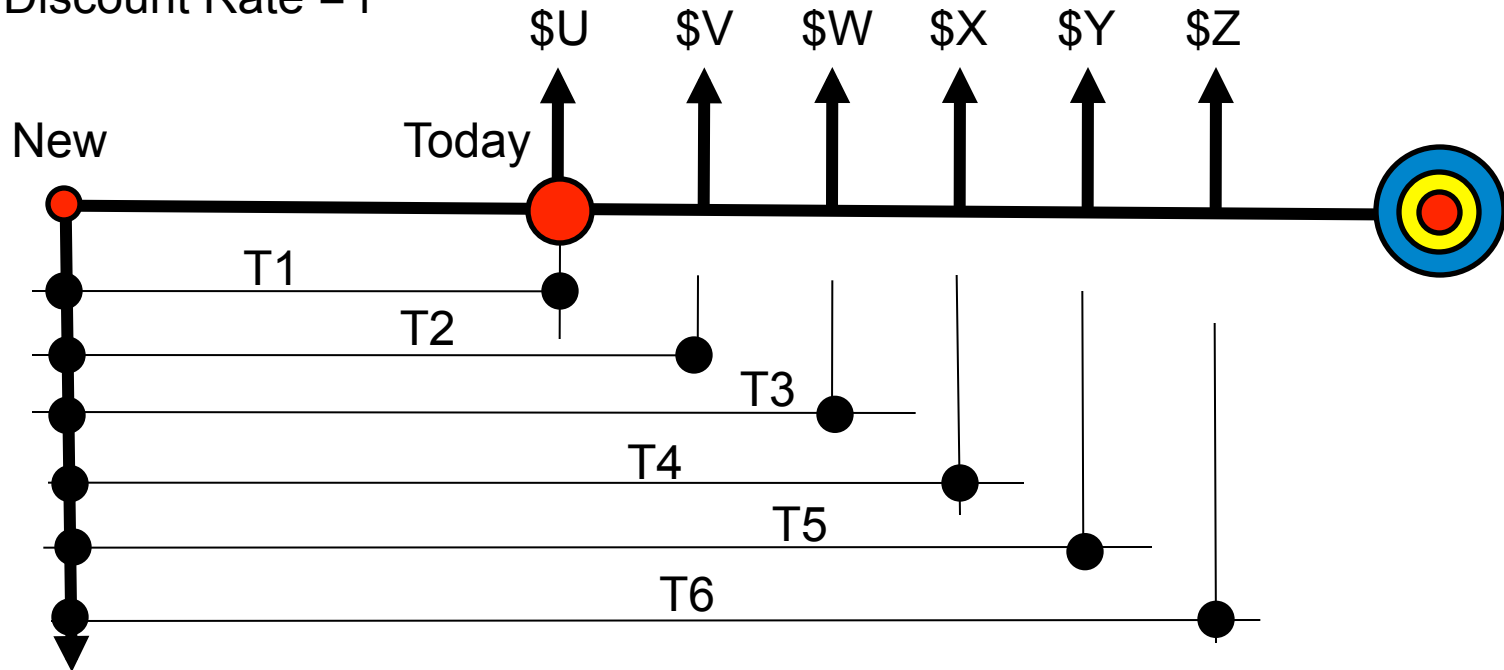
Life Cycle Cost Analysis (LCCA)

Discount Rate = i



Life Cycle Cost Analysis (LCCA)

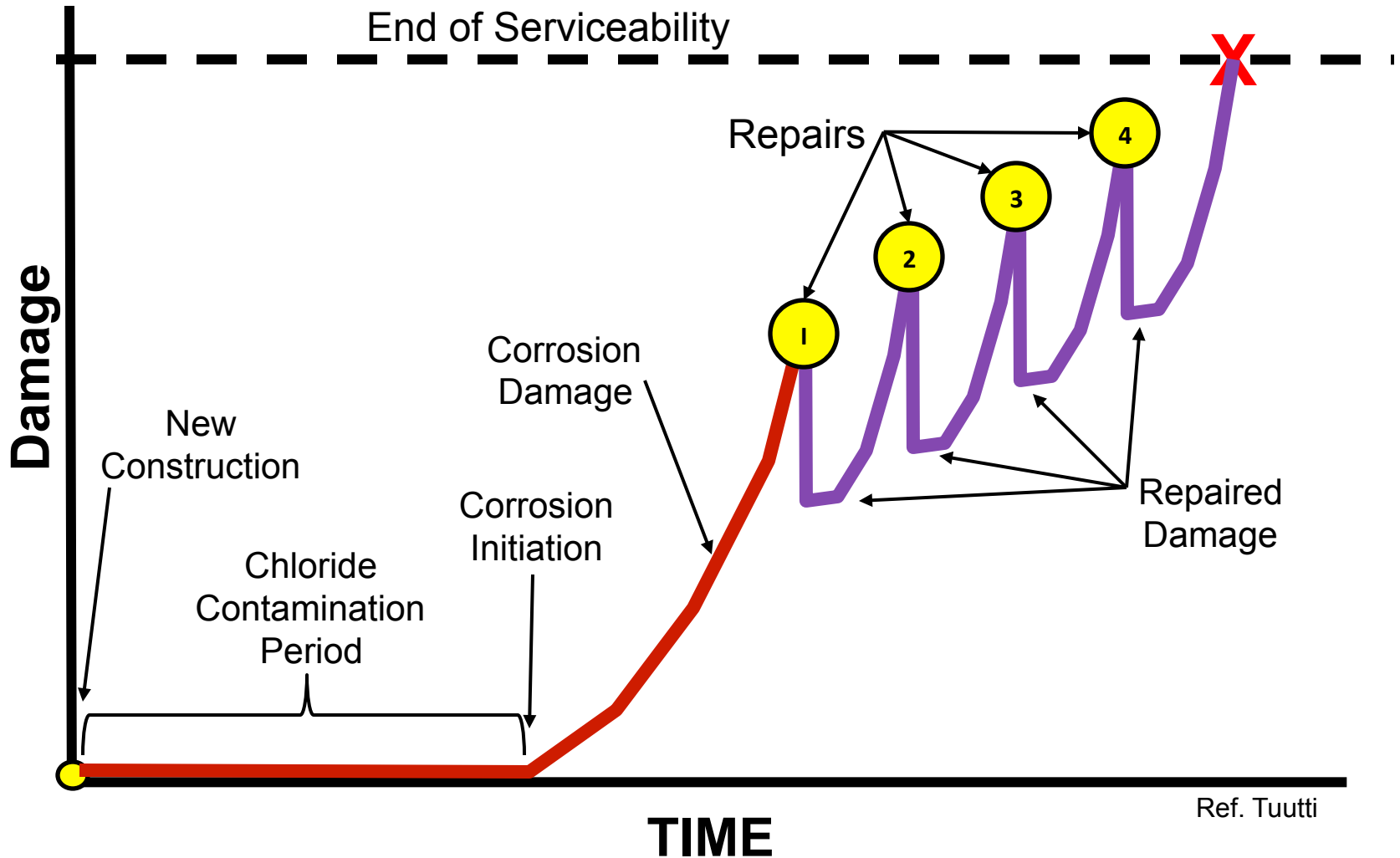
Discount Rate = i



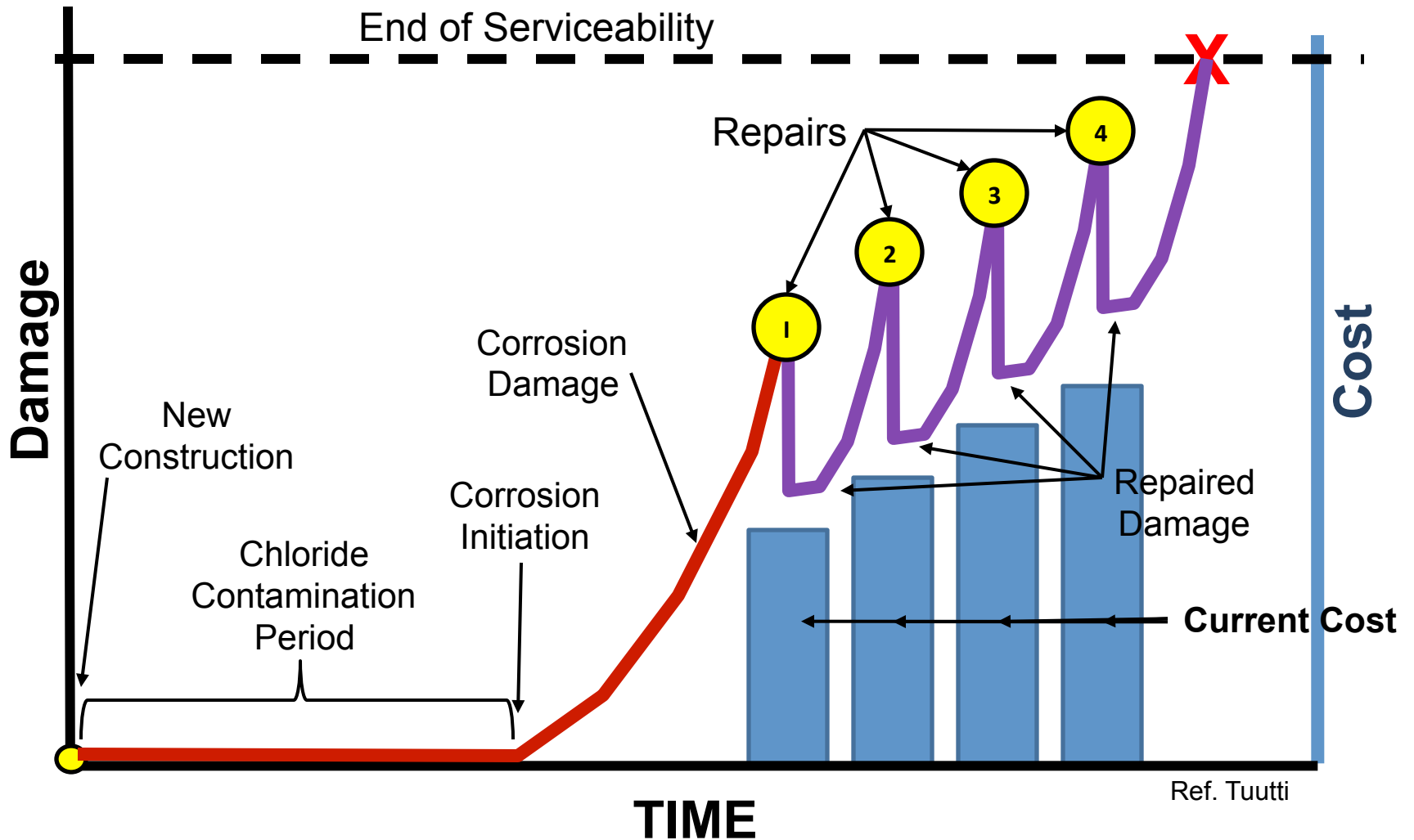
$$\text{NPV}_{\text{Life}} = [\$U / (1+i)^{T1} + \$V / (1+i)^{T2} + \$W / (1+i)^{T3}] + \dots$$

$$\text{NPV}_{\text{Today}} = [\$U + \$V / (1+i)^{T3-T2} + \$W / (1+i)^{T4-T3}] + \dots$$

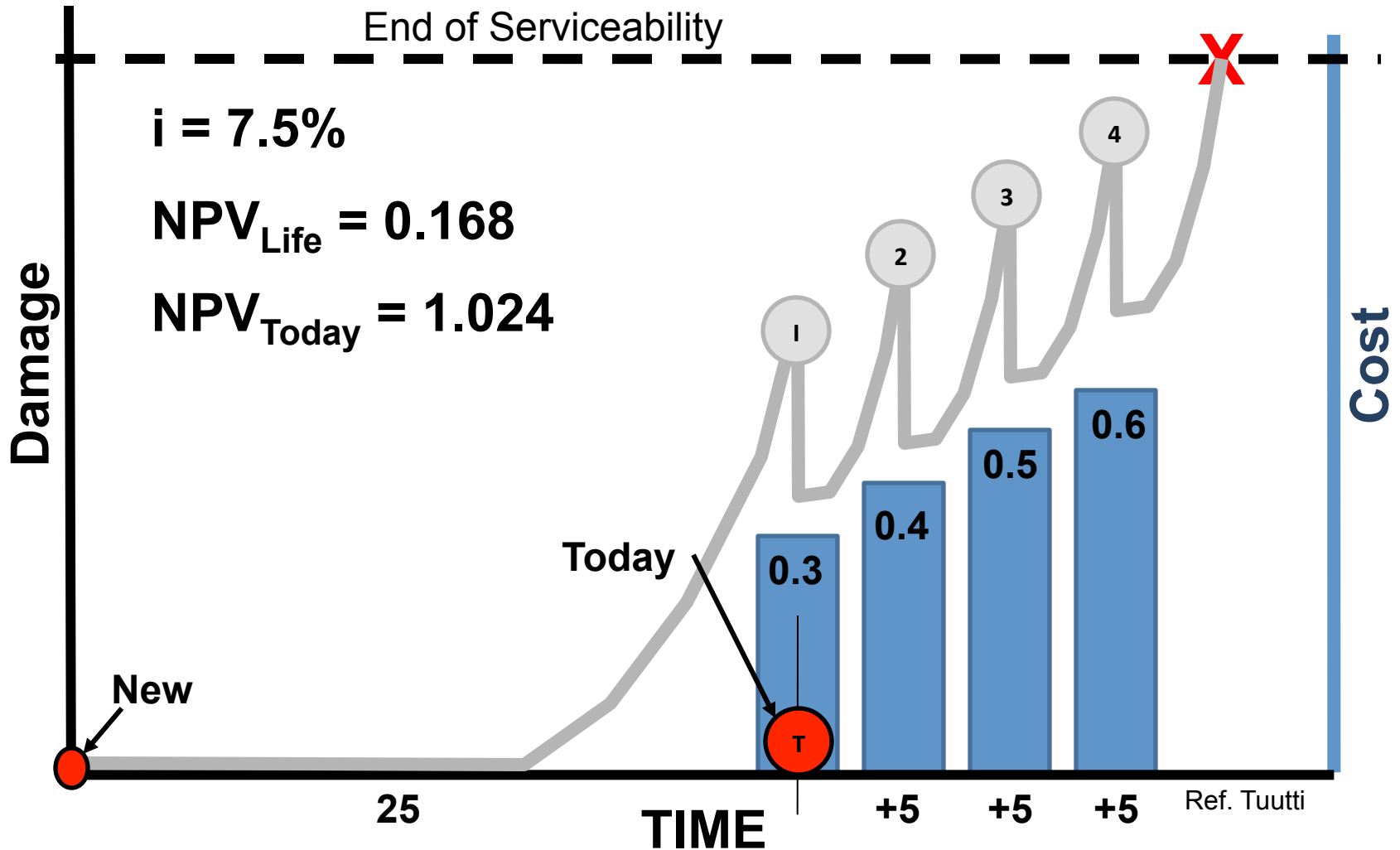
Case 1



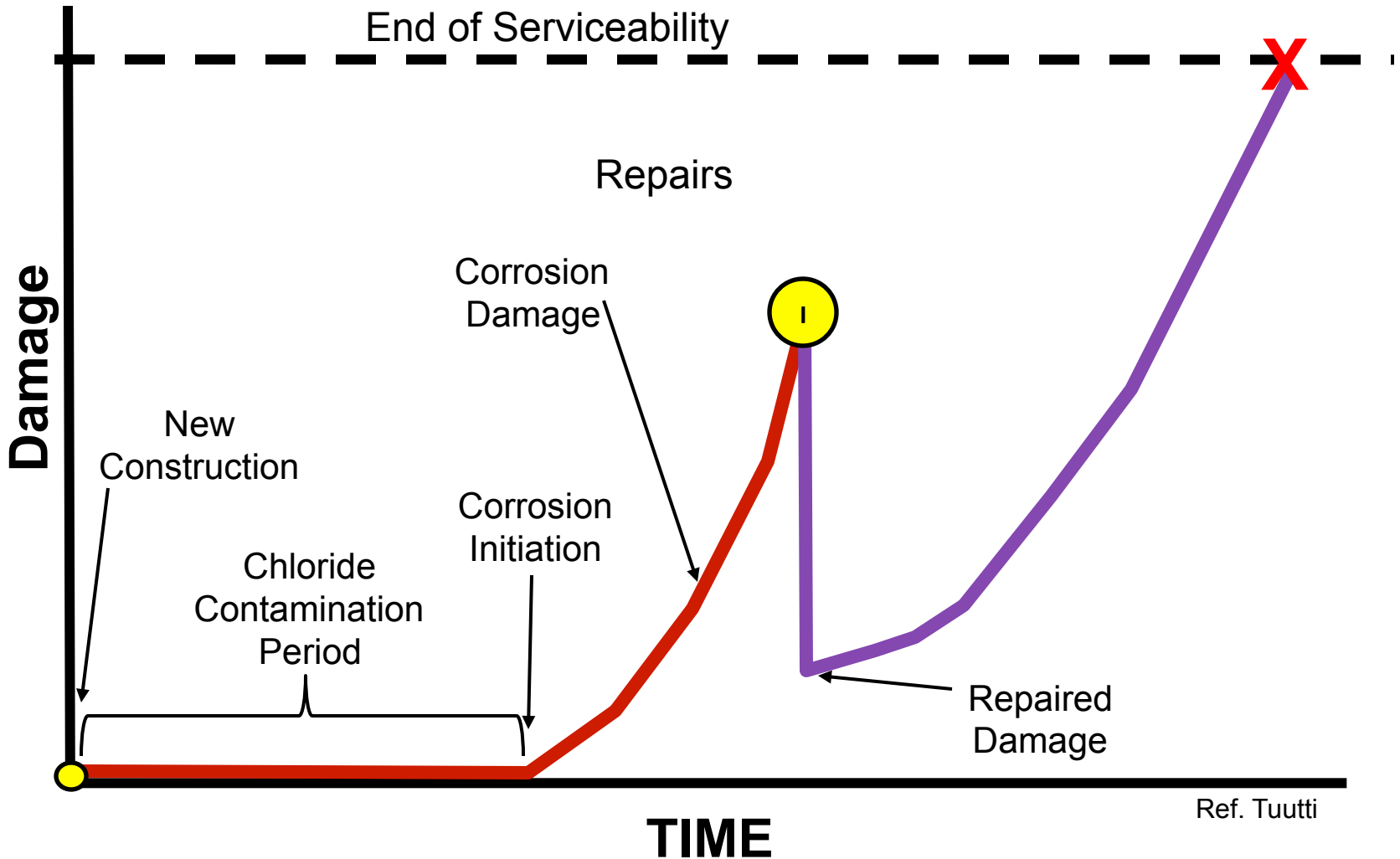
Case 1



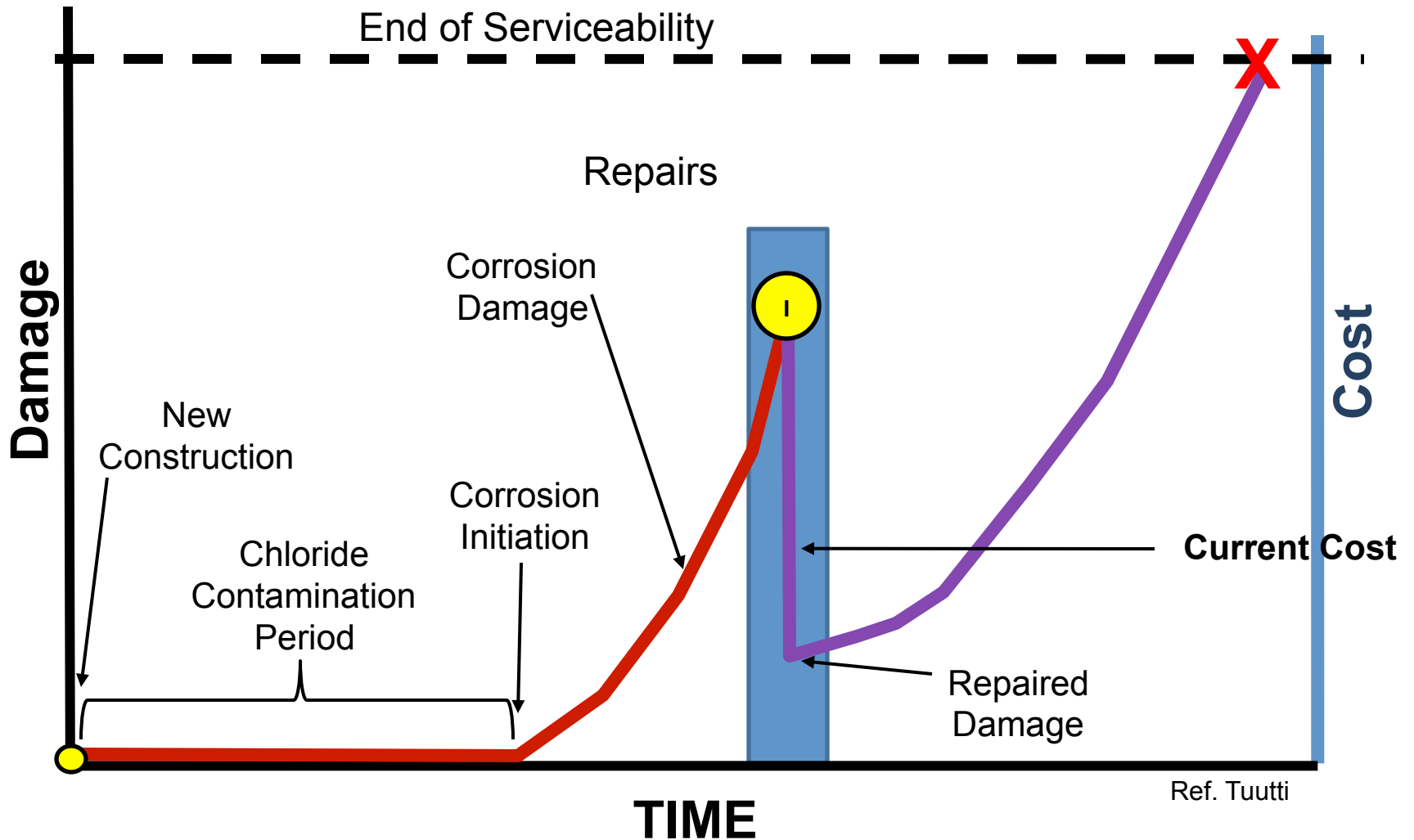
Case 1



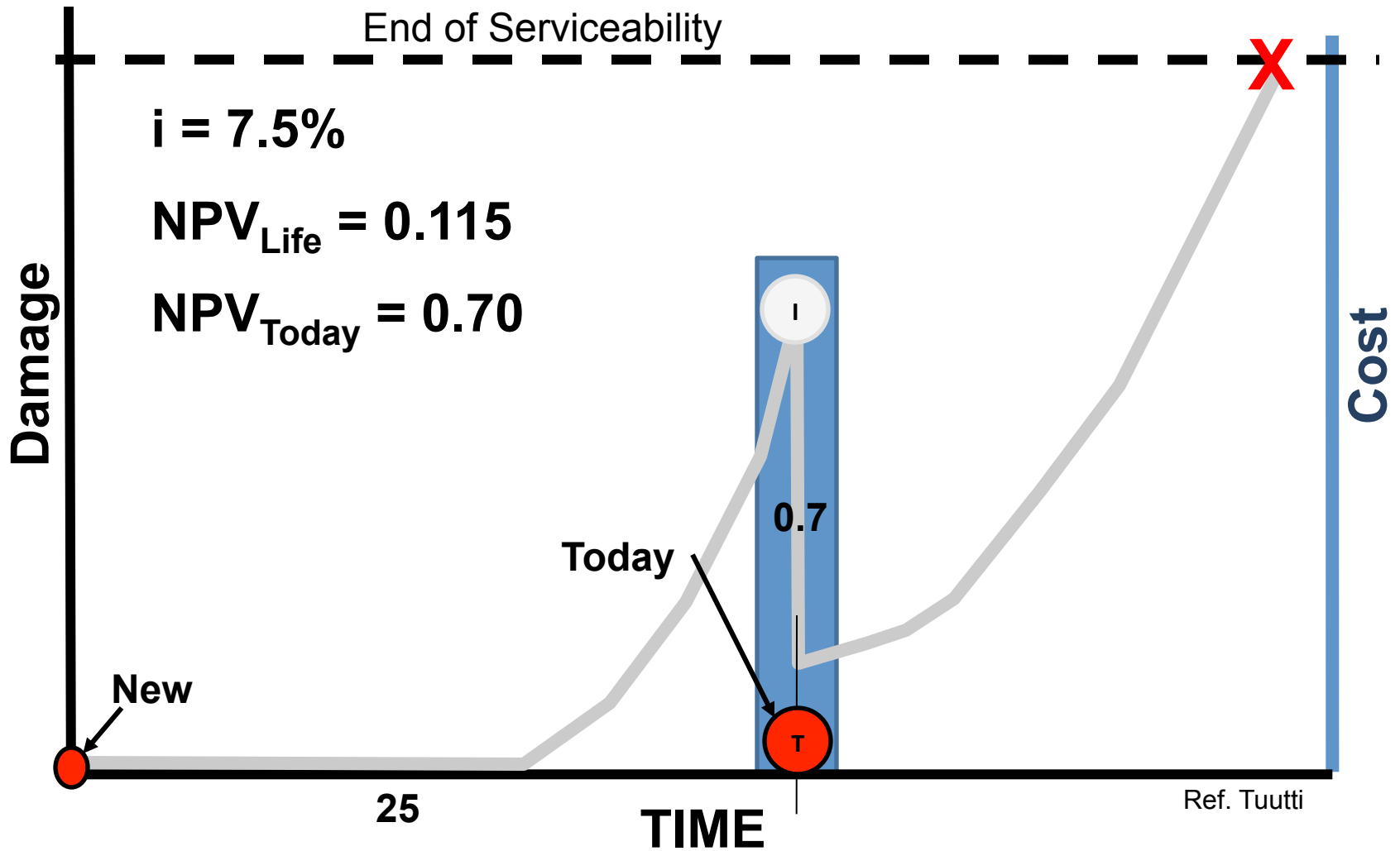
Case 2



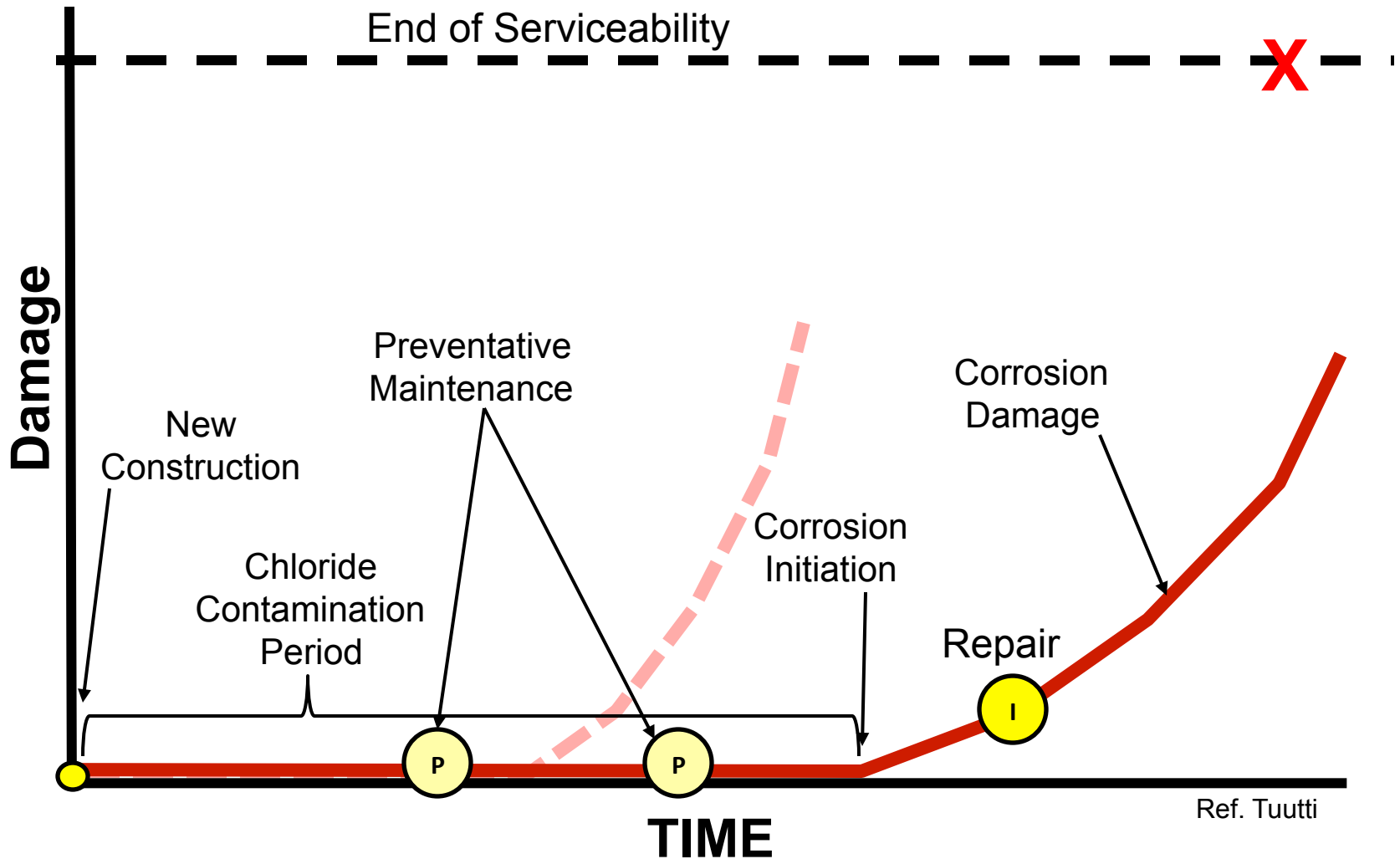
Case 2



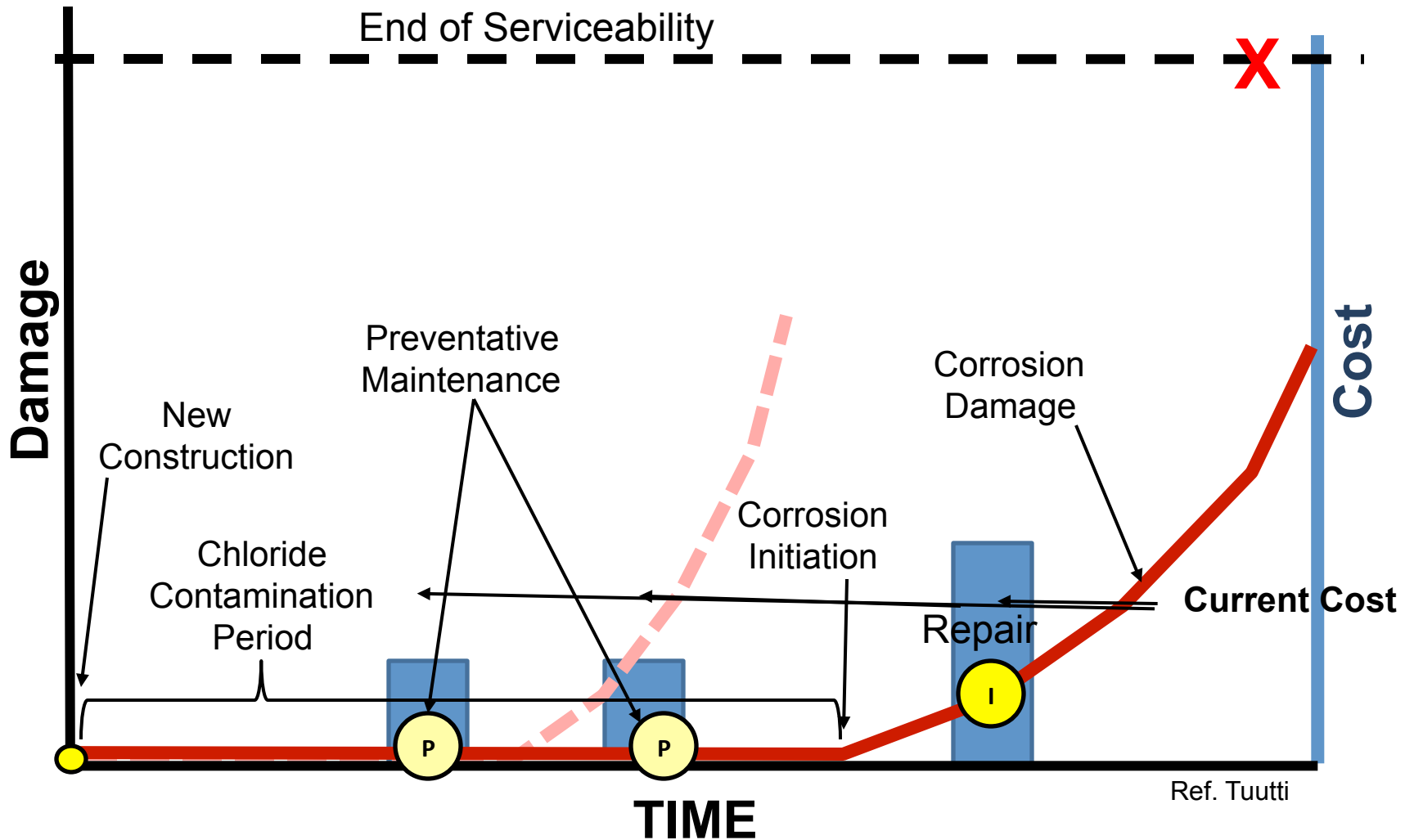
Case 2



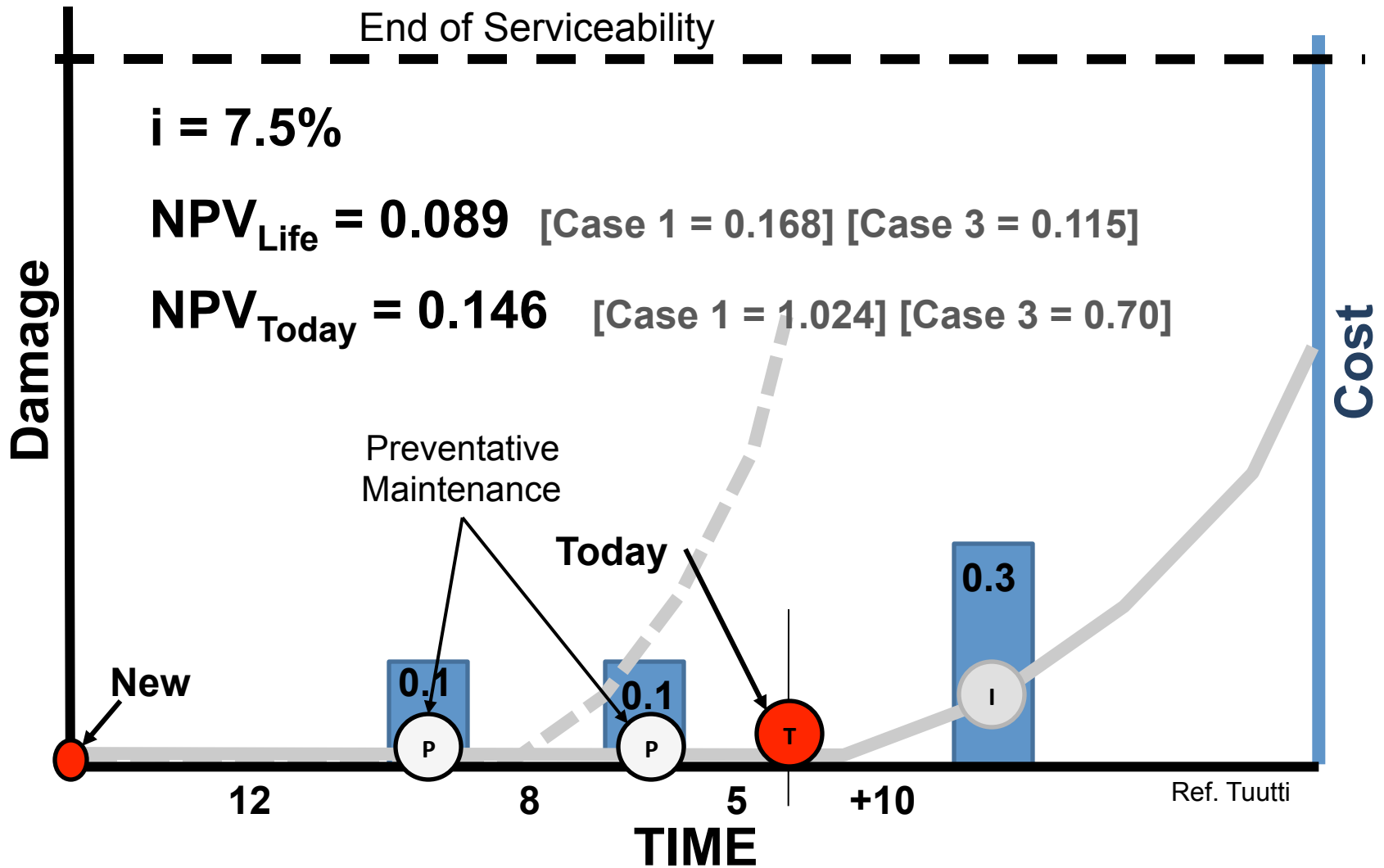
Case 3



Case 3



Case 3



Life Cycle Cost Comparison

	NPV (Life)	NPV (Today)
Case 1	0.168	1.024
Case 2	0.115	0.700
Case 3	0.089	0.146

TIME LINES of Service Life

