

Table 1 Degradation damage mechanisms

Major category	Fatihue	Creep	Corrosion										Wear	Ersion		Property deterioration			Fracture mode	
Middle category	Fatigue	Creep	Natural corrosion	Dry corrosion		Wet corrosion						Stress corrosion cracking (SCC)		Wear	Erosion		Property deterioration			Fracture mode
Minor category	Mechanical fatigue (high cycle fatigue)	creep deformation	Atmospher ic(External) corrosion	High temperature oxidation	Fuel ash corrosion	Freshwater corrosion	Hydrochloric acid corrosion	Ammonium chloride corrosion	Carbonic acid corrosion,	Oxygen concentration cell corrosion	Crevice corrosion	Sulfide stress corrosion cracking	Nitrate stress corrosion cracking	Adhesive wear	Erosion /Corrosion	Drop Slag erosion	Hydrogen embrittle-ment	Sensitization	Reheat(SR) cracking	Thinning
	Low cycle fatigue	Creep rupture	Condensa- tion corrosion	Steam oxidation	Coal ash corrosion	Seawater corrosion	Wet chlorine and hypochlorite corrosion	Ammonium hydrosulfid e corrosion	Sour water corrosion	Groove corrosion	Galvanic corrosion	hydrogen induced cracking (Hydrogen bulister)	Organic acid stress corrosion cracking	Sliding wear	Cavitation erosion	Coal particle erosion	Hydride embrittle-ment (Titanium)	Sigma phase embrittle-ment	Cladding delamina- tion	Cracking
	Contact fatigue	Long-term creep rupture	External stress corrosion cracking	Metal dusting	Black liquor smelt corrosion	Contamina- ted seawater corrosion	Sulfuric acid corrosion	Ammonia attack	Boric acid corrosion	Intergranular corrosion	Corrosion under deposit	Caustic (soda)crack- ing	High temperature water cracking	Corrosion wear	Solid particle impinge- ment erosin		Decarburization	Gamma prime (phase) embrittle-ment	Under- cladding cracking	Degrada- tion
	Fretting fatigue	Short time Creep rupture	Corrosion under insulation	Halogenated corrosion(High temperature Halogen corrosion	High temperature chloride salt corrosion	Flow accelerated corrosion	Phosphoric acid corrosion	CO2 corrosion	Caustic corrosion, Caustic gouging	Filiform corrosion	Down-Time Corrosion	Amine cracking	Tarnish Rupture	fretting corrosion	Liquid drop impinge- ment erosion		Carburization	Strain aging	475°C embrittle- ment	Deforma- tion
	corrosion fatigue	Creep embrittle- ment	Stress corrosion cracking under insulation	Sulfidation	High temperature carbonate corrosion	Dissolved oxygen corrosion, oxygen concentration cell corrosion	Nitric acid corrosion	Cooling water corrosion	Chelate corrosion	Formicary (ants' nest) corrosion	Stress corrosion	Carbonate cracking	Cyanide SCC	Fatigue wear	Inletattack		Nitriding	Tempering embrittlement	Disimilar metal weld embrittle- ment	Ductile fracture
	Thermal fatigue	Creep- fatigue rupture		High temperature sulfidation	Hydrogen attack	Acid dew point corrosion (sulfuric and hydrochloric acid dew point	Phosphate corrosion	Boiler water condensati on corrosion	Naphthenic acid corrosion	Chemical cleaning corrosion	Graphiti- zation corrosion	CO-CO ₂ -H ₂ O SCC	Ammonia SCC	Abrasive wear	Impingemen t attack		Liquid metal embrittle-ment	Softening (over aging)(carbide spheroidization)		Brittle fracture
	thermal attack (fire cracking)	Dissimilar metal weld cracking (DMW)		high temperature sulfide/hydrog en sulfide corrosion	Molten metal corrosion	Microbial corrosion	Phenolic corrosion	Pitting corrosion	Water line attack	Atmospheric tank bottom plate corrosion		Polythionic acid SCC	Irradiation assisted stress corrosion cracking (IASCC)		Sluly eroision		Graphitization	Sigma phase and chi phase embrittle-ment		Buckling
	Rolling contact fatigue	Relaxation		Molten salt corrosion		Soil corrosion	Wet sulfide corrosion, wet hydrogen sulfide corrosion	Hydrofluori c acid corrosion	Knife line attack	Selective corrosion (dealloying) de- component corrosion		Chloride SCC			Fly ash erosion		Isothermal aging embrittle- ment	Irradiation embrittle-ment		Loosing
	Ratcheting	Type IV cracking		Vanadium attack		Organic acid corrosion	Wet chloride corrosion, wet HCl-H2S corrosion	Amine corrosion	Stray current (concentrat ion cell) corrosion	Layered (exfoliation) corrosion		Hydrogen induced cracking in hydrofluoric acid			Soot blower erosion		Hot embrittlement (low ductility) of killed steel	Solum e expansion (swelling)		Staining and plugging