

Risk Assessment Matrix  
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MIL-STD-882E, Department of Defense Standard Practice – System Safety

Foreword... “This system safety standard practice is a key element of Systems Engineering (SE) that provides a standard, generic method for the identification, classification, and mitigation of hazards.”

**TABLE I. Severity categories**

SEVERITY CATEGORIES		
Description	Severity Category	Mishap Result Criteria
Catastrophic	1	Could result in one or more of the following: death, permanent total disability, irreversible significant environmental impact, or monetary loss equal to or exceeding \$10M.
Critical	2	Could result in one or more of the following: permanent partial disability, injuries or occupational illness that may result in hospitalization of at least three personnel, reversible significant environmental impact, or monetary loss equal to or exceeding \$1M but less than \$10M.
Marginal	3	Could result in one or more of the following: injury or occupational illness resulting in one or more lost work day(s), reversible moderate environmental impact, or monetary loss equal to or exceeding \$100K but less than \$1M.
Negligible	4	Could result in one or more of the following: injury or occupational illness not resulting in a lost work day, minimal environmental impact, or monetary loss less than \$100K.

**TABLE II. Probability levels**

PROBABILITY LEVELS			
Description	Level	Specific Individual Item	Fleet or Inventory
Frequent	A	Likely to occur often in the life of an item.	Continuously experienced.
Probable	B	Will occur several times in the life of an item.	Will occur frequently.
Occasional	C	Likely to occur sometime in the life of an item.	Will occur several times.
Remote	D	Unlikely, but possible to occur in the life of an item.	Unlikely, but can reasonably be expected to occur.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced in the life of an item.	Unlikely to occur, but possible.
Eliminated	F	Incapable of occurrence. This level is used when potential hazards are identified and later eliminated.	Incapable of occurrence. This level is used when potential hazards are identified and later eliminated.

**TABLE III. Risk assessment matrix**

<b>RISK ASSESSMENT MATRIX</b>				
<b>SEVERITY PROBABILITY</b>	<b>Catastrophic (1)</b>	<b>Critical (2)</b>	<b>Marginal (3)</b>	<b>Negligible (4)</b>
<b>Frequent (A)</b>	<b>High</b>	<b>High</b>	<b>Serious</b>	<b>Medium</b>
<b>Probable (B)</b>	<b>High</b>	<b>High</b>	<b>Serious</b>	<b>Medium</b>
<b>Occasional (C)</b>	<b>High</b>	<b>Serious</b>	<b>Medium</b>	<b>Low</b>
<b>Remote (D)</b>	<b>Serious</b>	<b>Medium</b>	<b>Medium</b>	<b>Low</b>
<b>Improbable (E)</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>	<b>Low</b>
<b>Eliminated (F)</b>	<b>Eliminated</b>			

COPA/ SMS Aviation Safety Report (with MIL-STD-882 additions as noted)

	<b>A</b> <b>Catastrophic</b> Destruction of property or loss of life	<b>B</b> <b>Major</b> Major damage and/or major personal injury	<b>C</b> <b>Minor</b> Minor damage and/or minor personal injury	<b>D</b> <b>Minimal</b> Inconvenience
<b>Likelihood</b>				
<b>Frequent</b> Likely to occur often (MIL-STD-882)	HIGH	HIGH	SERIOUS	MEDIUM
<b>1</b> <b>Occasional</b> Expected to occur, but not often	HIGH	HIGH	SERIOUS	MEDIUM
<b>2</b> <b>Seldom</b> Expected to occur infrequently	HIGH	SERIOUS	MEDIUM	LOW
<b>3</b> <b>Remote</b> Slight Chance that it might occur	SERIOUS	MEDIUM	MEDIUM	LOW
<b>4</b> <b>Improbable</b> Not likely to occur	MEDIUM	MEDIUM	MEDIUM	LOW
<b>5</b> <b>Extremely Improbable</b> Occurrence is almost inconceivable	LOW	LOW	LOW	LOW
<b>Eliminated</b> Incapable of Occurrence (MIL-STD-882)	ELIMINATED			

## ANSI Risk Assessment Matrix Example

Likelihood of Occurrence or Exposure	Severity of Injury or Illness Consequence and Remedial Action			
	<b>CATASTROPHIC</b> Death or permanent total disability	<b>CRITICAL</b> Disability in excess of 3 months	<b>MARGINAL</b> Minor injury, lost workday accident	<b>NEGLIGIBLE</b> First Aid or Minor Medical Treatment
<b>Frequent</b> Likely to Occur Repeatedly	<b>HIGH</b> Operation not permissible	<b>HIGH</b> Operation not permissible	<b>SERIOUS</b> High Priority action	<b>MEDIUM</b> Take Remedial action at appropriate time
<b>Probable</b> Likely to occur several times	<b>HIGH</b> Operation not permissible	<b>HIGH</b> Operation not permissible	<b>SERIOUS</b> High Priority action	<b>MEDIUM</b> Take Remedial action at appropriate time
<b>Occasional</b> Likely to occur sometime	<b>HIGH</b> Operation not permissible	<b>SERIOUS</b> High Priority action	<b>MEDIUM</b> Take Remedial action at appropriate time	<b>LOW</b> Risk Acceptable: Remedial Action Discretionary
<b>Remote</b> Not likely to occur	<b>SERIOUS</b> High Priority action	<b>MEDIUM</b> Take Remedial action at appropriate time	<b>MEDIUM</b> Take Remedial action at appropriate time	<b>LOW</b> Risk Acceptable: Remedial Action Discretionary
<b>Improbable</b> Very unlikely – may assume exposure will not happen	<b>MEDIUM</b> Take Remedial action at appropriate time	<b>LOW</b> Risk Acceptable: Remedial Action Discretionary	<b>LOW</b> Risk Acceptable: Remedial Action Discretionary	<b>LOW</b> Risk Acceptable: Remedial Action Discretionary

## Other example of Risk Assessment Matrices

			Potential Consequences				
			L6	L5	L4	L3	L2
			Minor injuries or discomfort. No medical treatment or measureable physical effects.	Injuries or illness requiring medical treatment. Temporary impairment.	Injuries or illness requiring hospital admission.	Injury or illness resulting in permanent impairment.	Fatality
			Not Significant	Minor	Moderate	Major	Severe
Likelihood	Expected to occur regularly under normal circumstances	Almost Certain	Medium	High	Very High	Very High	Very High
	Expected to occur at some time	Likely	Medium	High	High	Very High	Very High
	May occur at some time	Possible	Low	Medium	High	High	Very High
	Not likely to occur in normal circumstances	Unlikely	Low	Low	Medium	Medium	High
	Could happen, but probably never will	Rare	Low	Low	Low	Low	Medium