



Machine Criticality Factor (MCF)

De-Risk your plant

Criticality, or the risk that something will fail and cause negative effects on the system, is the starting point of reliability.

- 1 Monitor your machine criticality factor on real time basis
- 2 Low risk of causing minimum downtime and repair costs, high risk of prolonged downtime, safety hazards, and expensive repairs
- 3 Machine that is critical in your production area and requires expensive parts to repair would have a high MCF.
- 4 Map the current MCF with Failure Occurrence Factor and enable mitigation plan to De-Risk the machine and eliminate downtime

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

DID YOU KNOW?

The Reliability Elements Quotient (REQ) identifies the factors that affect the occurrence of failures in machines

TRACK YOUR MACHINES

For any given machine, how critical is its reliability?

What if it failed suddenly and catastrophically?

What would be the consequences - lost production, expensive repairs, fatality?

There's also priority. What should be done first, second and third, and what should not be done at all?

How do you know which machines return big money for enhanced reliability, which machines return marginal money and which machines return nothing at all?

Having predictive tools or methods that allow the early detection of failures can significantly reduce the MCF.

Why spend an incremental rupees to enhance a machine's reliability if it doesn't yield multiple rupees in return?

To achieve the optimum reliability in machines and equipment, you need to understand Overall Machine Criticality (OMC). The concept of OMC lets you analyze risk profiles and adjust your maintenance efforts to ultimately achieve precision and efficiency.



Overall Machine Criticality Matrix

De-Risk your plant

To estimate your machine's Failure Occurrence Factor (FOF), you must have an accurate and detailed record of its repair and failure history.

- 1 Failure history of your machine is excellent metrics to rate your machines – Failure Occurrence Factor.
- 2 Low FOF involves having a long history of use and zero failure events or no signs of failure in the future
- 3 High FOF means the machine is prone to failure or failing within the first year of service or repair.
- 4 If a history of repair and failure is not available, FOF can be estimated using the Reliability Elements Quotient (REQ)

		MACHINE CRITICALITY FACTOR									
		1	2	3	4	5	6	7	8	9	10
FAILURE OCCURRENCE FACTOR	1	1	2	3	4	5	6	7	8	9	10
	2	2	4	6	8	10	12	14	16	18	20
	3	3	6	9	12	15	18	21	24	27	30
	4	4	8	12	16	20	24	28	32	36	40
	5	5	10	15	20	25	30	35	40	45	50
	6	6	12	18	24	30	36	42	48	54	60
	7	7	14	21	28	35	42	49	56	63	70
	8	8	16	24	32	40	48	56	64	72	80
	9	9	18	27	36	45	54	63	72	81	90
	10	10	20	30	40	50	60	70	80	90	100

Colour	Risk	Remediation Required
Red	Extreme Risk	Immediate
Amber	High Risk	High Priority
Yellow	Manageable Risk	As soon as possible
Green	Minor Risk	Continuous Improvement
Blue	Low Risk	None

The Overall Machine Criticality (OMC) matrix includes the Machine Criticality Factor on the X-axis, the Failure Occurrence Factor on the Y-axis, and five risk zones, each represented by a different colour.

Through the OMC matrix, you can easily observe the machines in increasing or decreasing risk. Thus, you can identify the immediacy or level of attention you need to assign to these machines. Low-risk machines do not need immediate attention, while high-risk machines need immediate and close attention.

The Reliability Elements Quotient (REQ) identifies the factors that affect the occurrence of failures in machines

MACHINE DUTY

Machine duty or the compilation of operations or duties that can cause the machine to fail prematurely. A mixer that operates at high pressure, high loads, and multiple batches would have a higher score than the one used at a lower pressure, with lighter loads, and with less frequency.

LUBRICANT PERFORMANCE

Lubricant performance or the quality of the lubricant used in preventing friction and wear. High scores in this area mean that the lubricant is not ideal for the machine or is of poor quality.

LUBRICANT EFFECTIVENESS

Lubricant effectiveness or the process of applying lubricants to machines to prevent wear and extend performance. A machine that requires frequent or high levels of lubrication and shows signs of wear frequently will get a high score on this criterion.

OVERALL MACHINE CRITICALITY MATRIX

By multiplying the MCF and FOF ratings, you get Overall Machine Criticality which will allow you to classify machines as low-risk or high-risk

ENVIRONMENTAL CONTAMINATION

Environmental contamination or the likelihood that the surrounding area, process, and other environmental factors can contribute to failure. A machine exposed to a dirt-heavy environment would have a higher score than one in a clean and isolated area.

PREDICTIVE TECHNOLOGIES

Predictive technologies or the presence of tools and methods that help detect early warning signs of failure. High scores would be given to a machine not inspected daily for preventive maintenance or not subjected to oil analysis for signs of wear.

Early Warning Systems - Early warning technology also impacts the probability of failure. This is done by catching incipient failures or root-cause conditions that are the precursors to failures. Oil analysis and comprehensive daily machine inspections are extremely effective at providing early warning to a host of problems.

To achieve the optimum reliability in machines and equipment, you need to understand Overall Machine Criticality (OMC). The concept of OMC lets you analyze risk profiles and adjust your maintenance efforts to ultimately achieve precision and efficiency.