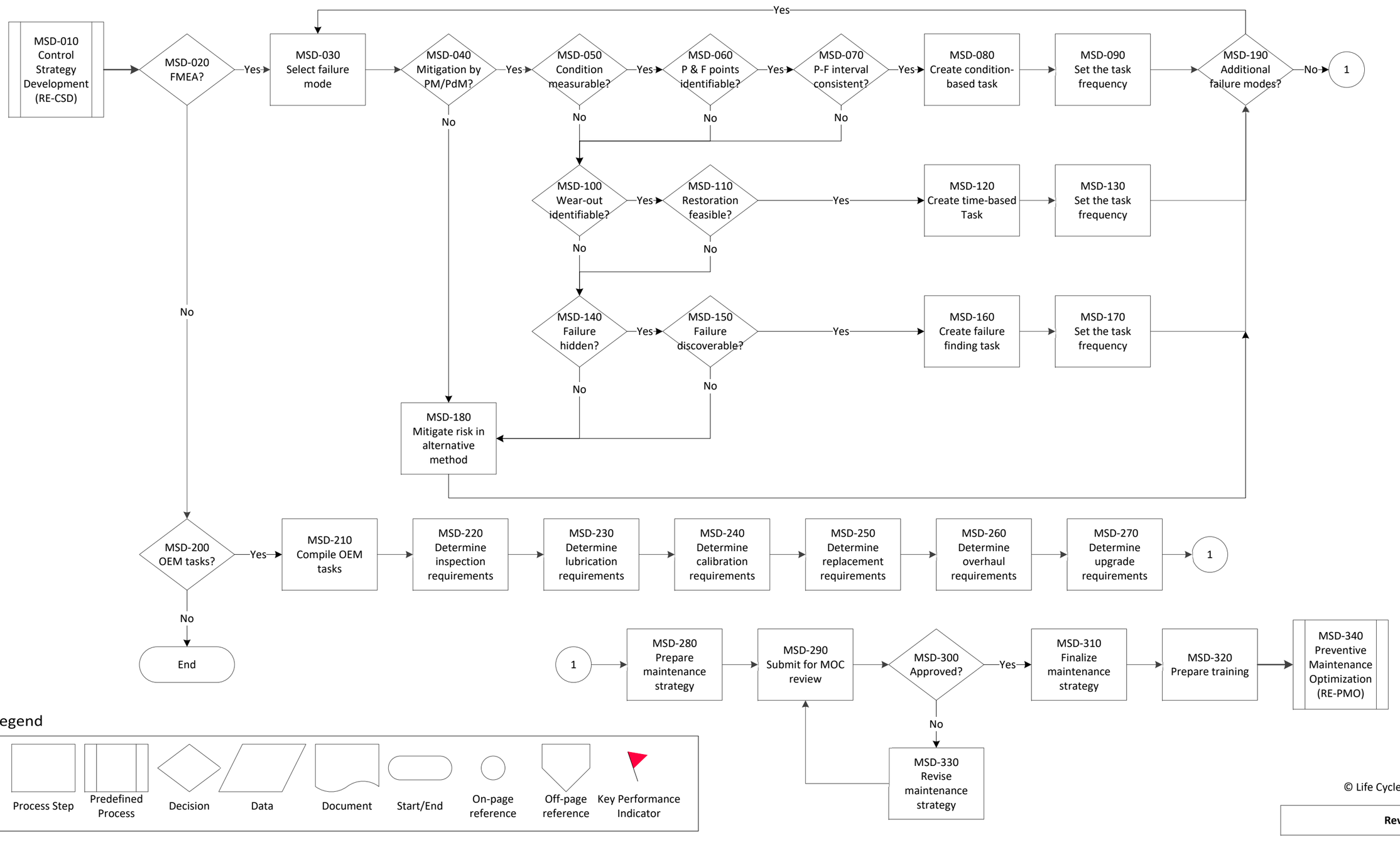
Reliability Engineering (RE-07)
Maintenance Strategy Development (RE-MSD)



Legend

Process Step · Predefined Process · Decision · Data · Document · Start/End · On-page reference · Off-page reference · Key Performance Indicator

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Rev 7.1

Maintenance Strategy Development Step Definitions

Step Number	Step Description	Step Definition
MSD-010	Control Strategy Development (RE-CSD)	Refer to RE-CSD process.
MSD-020	FMEA?	If the risk control strategy was an FMEA, select failure mode.
MSD-030	Select failure mode	Based on the FMEA analysis performed as part of the risk control strategy, select a Failure Mode that has been identified as needing a mitigation strategy.
MSD-040	Mitigation by PM/PdM?	If the mitigation for the unacceptable Failure Mode involves the creation of a Preventive, Predictive or Condition-based task, determine if condition is measureable. If the mitigation involves changing the design or specifying critical spares, mitigate risk in alternative method.
MSD-050	Condition measurable?	Determine if the less-than-optimal condition of the equipment is apparent and measurable through either advanced technologies (vibration, ultrasound, thermography, etc.) or human senses (visual, auditory, etc.).
MSD-060	P & F points identifiable?	With respect to the P-F curve, can two points be defined that describe: -(P) a condition that indicates that degradation has begun and a failure will occur, but the equipment is still functional and operational, and, -(F) a condition that indicates that the function of the equipment can no longer be met, but the equipment may still be operational?
MSD-070	P-F interval consistent?	Is the amount of elapsed time, cycles, or distance between the P and F points relatively consistent, and does the frequency allow for a number of inspections to occur between them?
MSD-080	Create condition-based task	Fill out the "Recommended Improvements/Actions" column in the FMEA with the On-Condition task that you create, e.g. "*Check that the thickness of the brake pad is between 1/4 and 1/8 inches".*
MSD-090	Set the task frequency	Fill out the "Recommended Improvement Frequency" column in the FMEA with a period of time, number of cycles, or distance that would allow for at least two checks or inspections to be made within the P-F interval. For example, if it takes six months for the brake pad to erode from 1/4 inch to 1/8 inch, set the task frequency to two or three months.
MSD-100	Wear-out identifiable?	Can the failure profile for this equipment's Failure Mode be described as "increasing"? Can a point be defined when the probability of failure tomorrow is greater than the probability of failure today?
MSD-110	Restoration feasible?	Can the equipment be repaired, replaced, or serviced back to optimal condition?
MSD-120	Create time-based task	Fill out the "Recommended Improvements/Actions" column in the FMEA with the Hard Time or Servicing task that you create. For example, "Replace the coupling".
MSD-130	Set the task frequency	Fill out the "Recommended Improvement Frequency" column in the FMEA with a period of time, number of cycles or distance such that the task is completed before a significant increase in the probability of failure. For example, if the number of days between installation of the coupling and the point at which there is a significant probability that the coupling will be worn out is 3 years, set the task frequency to 2 years.

Step Number	Step Description	Step Definition
MSD-140	Failure hidden?	Would the failure of this equipment not be immediately noticed by operations or maintenance?
MSD-150	Failure discoverable?	Could the fact that the equipment is in a failed condition be discovered by operations or maintenance?
MSD-160	Create failure finding task	Fill out the "Recommended Improvements/Actions" column in the FMEA with the Failure Finding task that you create, e.g. "*Test run the redundant pump to ensure operation".*
MSD-170	Set the task frequency	Fill out the "Recommended Improvement Frequency" column in the FMEA with the period of time, number of cycles, or distance required to achieve an acceptable level of availability. For example, if the function supported by the redundant pump requires a high level of availability, the pump may need to be tested weekly to increase likelihood of discovering the abnormal condition.
MSD-180	Mitigate risk in alternative method	Since the risk mitigation from this Failure Mode will not be reduced or eliminated through PM, PdM or CBM, identify an alternate method.
MSD-190	Additional failure modes?	Are there additional Failure Modes in the FMEA with an unacceptable RPN?
MSD-200	OEM tasks?	If the risk control strategy was an FMEA, compile OEM task, if No, go to End.
MSD-210	Compile OEM tasks	Pull together all OEM tasks from O&M manuals or other resources.
MSD-220	Determine inspection requirements	Are there any additional or special (PSM) tasks not otherwise covered?
MSD-230	Determine lubrication requirements	Are there any lubrication-based tasks not otherwise covered?
MSD-240	Determine calibration requirements	Are there any calibration-based tasks not otherwise covered?
MSD-250	Determine replacement requirements	Are there any periodic replacement tasks not otherwise covered?
MSD-260	Determine overhaul requirements	Are there any overhaul tasks not otherwise covered?
MSD-270	Determine upgrade requirements	Are there any upgrade tasks not otherwise covered?
MSD-280	Prepare maintenance strategy	Compile all recommended tasks (from FMEA or OEM recommendations) into a complete list with task, frequency, estimated hours to complete, Craft, etc.
MSD-290	Submit for MOC review	Submit list of recommended tasks to appropriate individuals for approval.
MSD-300	Approved?	Did the appropriate individuals approve the list of tasks, or is additional work required?
MSD-310	Finalize maintenance strategy	Incorporate any comments/suggestions from the Approval step.
MSD-320	Prepare training	Create Single Point Lessons or training documents.
MSD-330	Revise maintenance strategy	Fill out the Header information and leave the rest of the form blank, to record that the RTF strategy was adopted.

MSD-340	Preventive Maintenance Optimization (RE-PMO)	Refer to RE-PMO process.