# Maintenance Strategy Development Step Definitions

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| **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. |
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| 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. |