Work progress and actions completed towards critical components and equipment

27th Feb 2023

KiwiRail

Actions undertaken towards critical equipment/components

- Focused work groups for identification of critical equipment/components – workshop activity
- Re-alignment of critical equipment and components within Planned Maintenance System (PMS) - AMOS
- Identification of any overdue/deferred maintenance activity on Critical equipment list
- Risk Assessment on any overdue/deferred maintenance activity where appropriate
- Work plan towards any overdue/deferred maintenance activity
- Verification of completed and planned maintenance activity

Identification of critical equipment/components – workshop activity

- Workshop activity involving stakeholders
    a. Ships' Chief Engineers
    b. Fleet Operations team
    c. Program and Asset manager
    d. Safety and compliance manager, DPA
    e. AMOS Management lead
- Relooking at existing critical component and equipment lists with process safety management lens
- Critical equipment list reworked using :
    - FMEA reports where available
    - Single-Point failure vulnerability
    - HAZID
    - OCIMF and IACS guidance on identification of critical equipment, including availability of redundancy & interdependency
    - Operational constraints
- Inquiry at sub-component, equipment and minor part levels towards classifying as critical equipment/part. Keeping in mind functionality/ reliability/ availability/ survivability
- Ensuring that redundancy availability of an equipment is also critiqued as to:
    a. What makes the redundancy fully independent?
    b. If inter-dependency of redundant equipment is through an electrical component, then such electrical parts/circuitry will be reviewed for upkeep, maintenance and availability of spares
- Cleaning the existing lists of anomalies or non-critical items
- Improving linkages of critical work orders at level of sub-components and equipment
- Creating additional routines for inspections, tests and renewals according to the operational environment, engineering expertise and continuous improvement processes. In some cases, this means going over and beyond makers' suggested routines

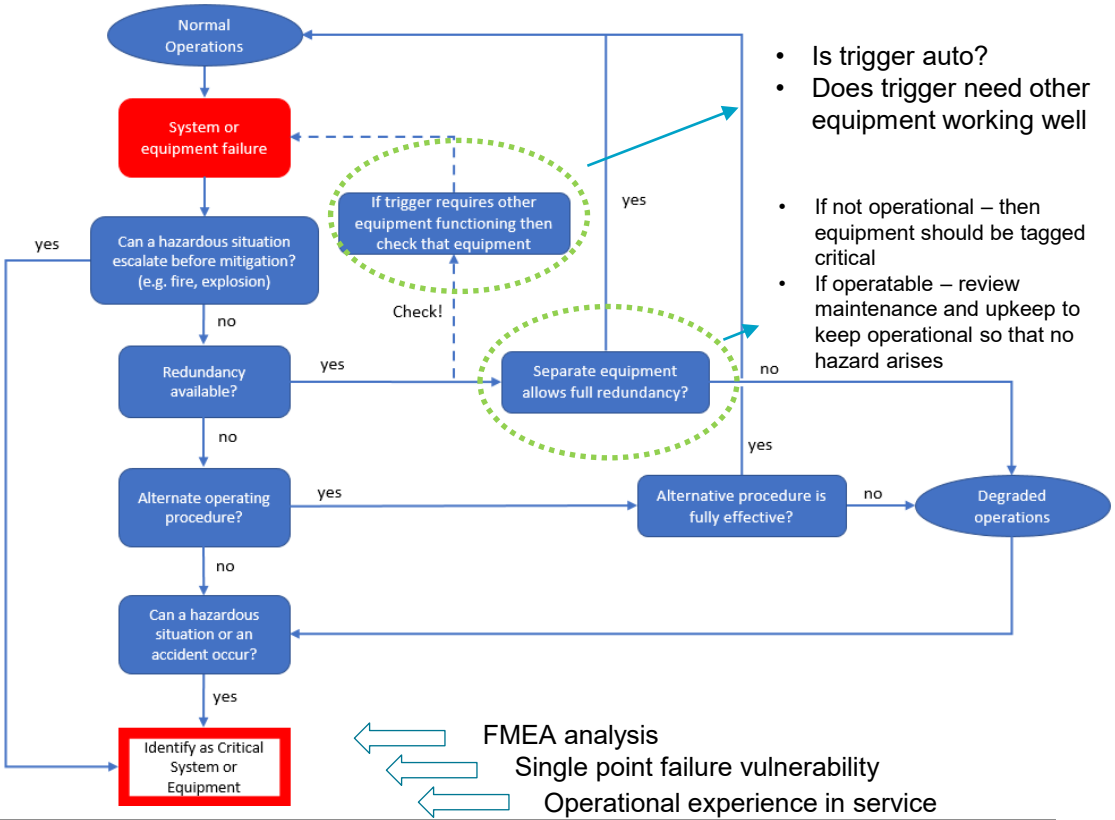
Methodology used in workshop to tag criticality

Key changes in methodology used as compared to OCIMF/IACS method:

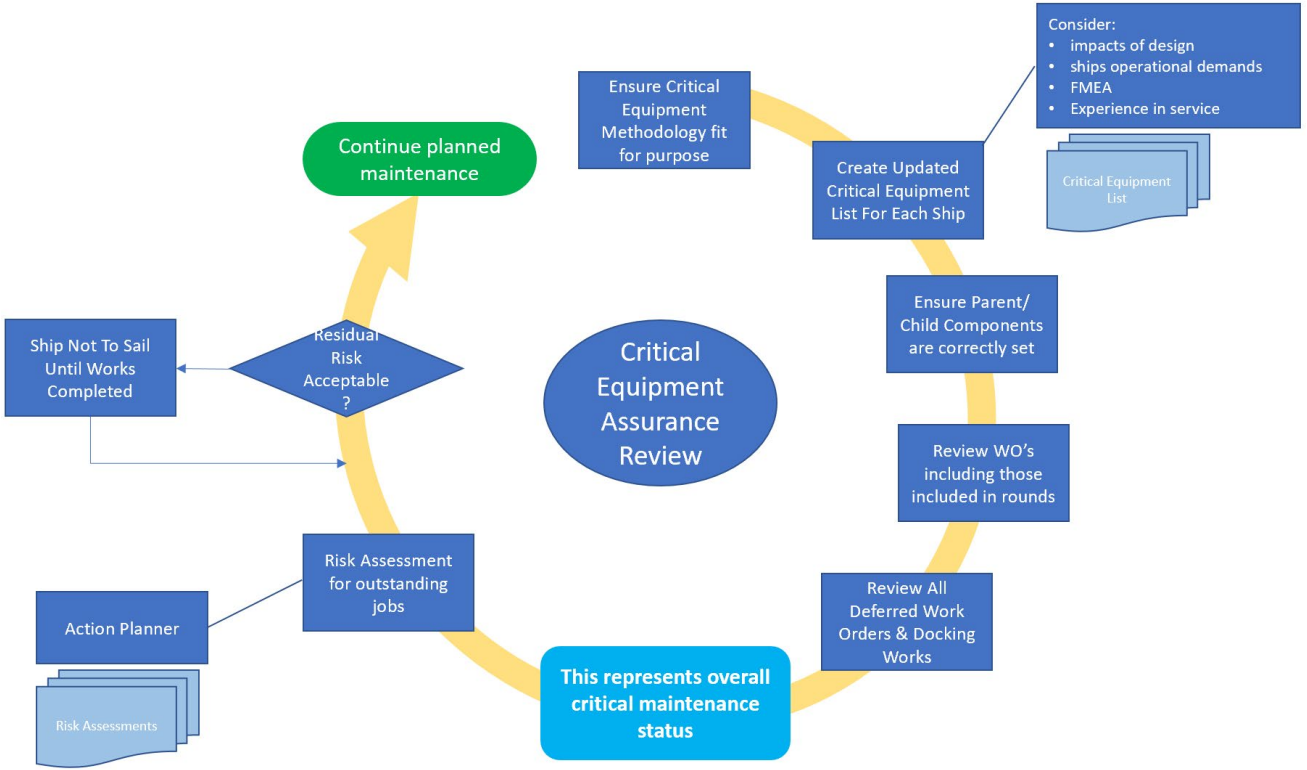
- Looking at criticality at subcomponent, equipment and parts level
- Not moving for fully redundant equipment directly to 'Not Critical' tagging
- Looking at triggers which enable redundancy to activate
- Looking at key operational input from frontline staff towards their experience with equipment
- Looking at FMEA analysis if available to input into critical component tagging

Safety critical focus:

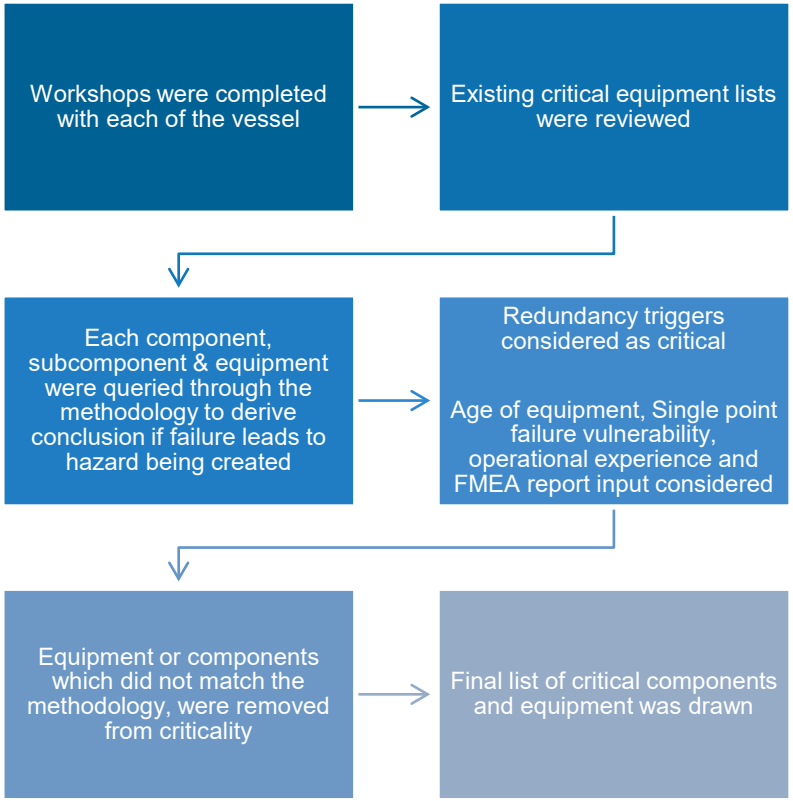
- ➢ Current focus on Safety Critical systems and equipment
- ➢ Potential categorization into operational critical & other categories such as environmental critical/navigational critical
- ➢ Mitigation of hazard arising from operation is at focus



Critical equipment review process map



Summary of actions on fleet vessels



Total number of components reviewed	
Aratere	1865
Kaitaki	3335
Kaiarahi	2386
Valentine	2484

Vessel wise summary of outcome of reviews - Fleet

VESSEL	Total components and subcomponents	Critical tagged post review	No. of critical work orders post review
Kaiarahi	2368	75	180
Kaitaki	3335	101	224
Aratere	1865	105	200
Valentine	2484	88	150

- New added critical components will be reviewed for their inspection routines, testing routines and renewal jobs and upkeep strategy for maintenance in long term
- Alongside the review, critical spares and stock min levels will be added
- These final critical components will form focus of enhanced inspection regime & will have priority over routine maintenance activity in planned layups and timetable changes
- Final lists will be subject to review once the DNV-GL/LR's assessment will be released

Results/Impact of the review

With complete review of critical equipment and addition of several components under criticality purview, following was the impact:

- Fleetwide for RoPax vessels, total of 258 work orders were elevated from Non-Critical category to Critical category
- Most of the reclassified work orders were compliant with their due date (highlighting that the underlying asset management system was working effectively)
- Compliance report from AMOS system extracted to confirm completion of work orders
- Weekly compliance report on maintenance activity through AMOS will be generated and reviewed by management

Ref. attached:

Work plan and Risk Assessments for due work orders after review
Reviewed critical equipment lists of vessels (extract) if required*

Additional actions in progress towards maintenance uplift

- Improvements in safety management system
- Review of planning/timetable change process in line with technical upkeep of vessels – to increase frequency/length of off-run periods for the vessels
- Fleetwide FMEA and detailed assessment of critical equipment using external accreditors, DNV-GL engaged
- Enhanced technical inspections using external and internal resources (improved checklist developed).
  - Kaitaki : Completed
  - Kaiarahi: Completed
  - Aratere: Planned for 28th Feb 23
- Additional weekly technical meetings (with management and technical staff) arranged to discuss: technical defects, PMS due routines, and provide input into planning of layup/off-run periods. Weekly compliance report from AMOS on maintenance report will be one of the agenda items of weekly meeting
- Focused actions on LT/HT cooling systems on all vessels as identified in the Interislander preliminary investigation report
- Bulletins to fleet on actions required and review/enhancement of contingency procedures (technical focused). Includes SOP for cooling systems recovery

Thank you
KiwiRail