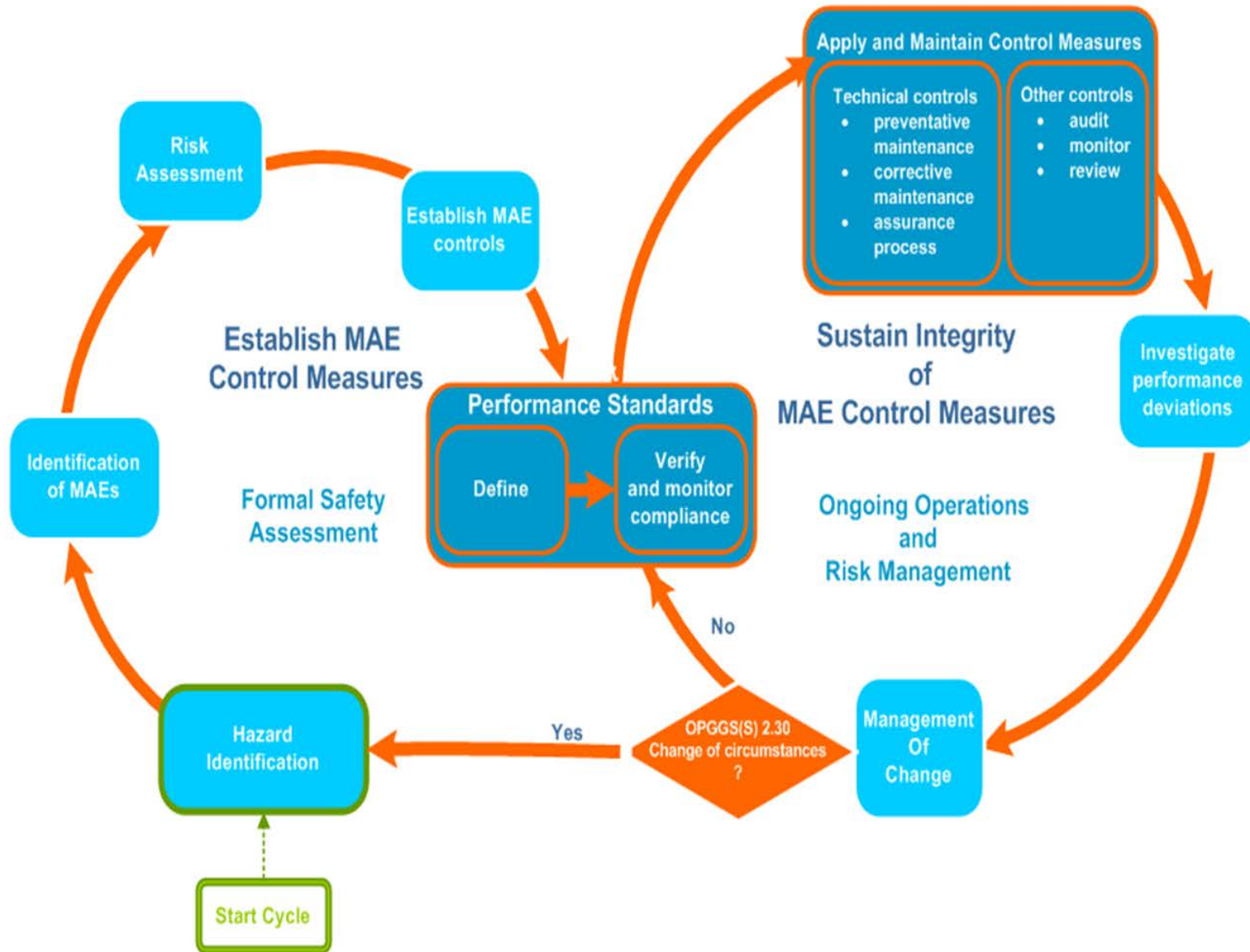


# Performance standards in the management of risk of major accident events

Michael Coppen

OHS Inspector

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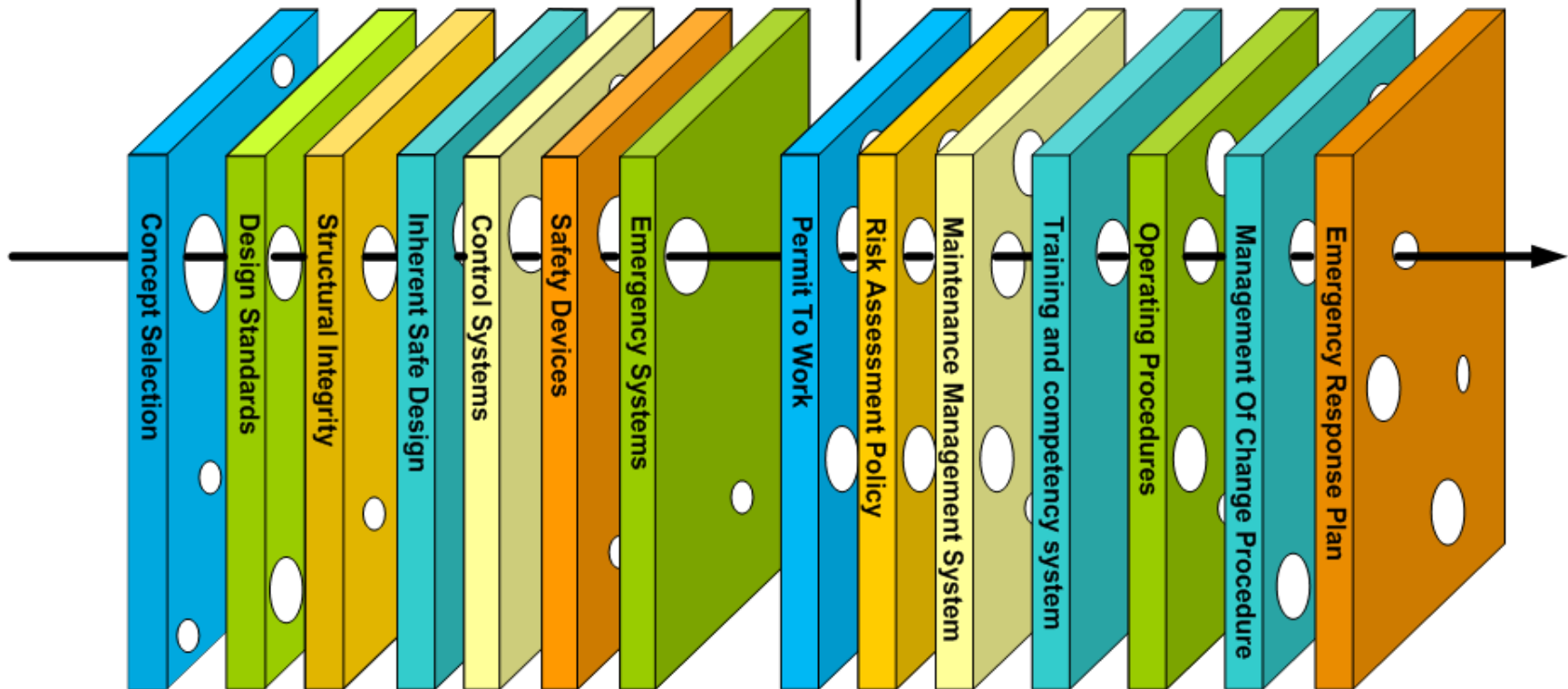


## Definition

- ***Performance Standard*** means a standard, established by the operator, of the performance required of a system, item of equipment, person or procedure which is used as a basis for managing the risk of a major accident event.

## Regulations

- 2.5 (3) (i) – The Safety Case for the facility must also contain a detailed description of the safety management system that specifies the performance standards that apply.
- 2.20 (2) (b) – The (emergency response) plan must specify the performance standards that it applies.

**Technical Controls****Other Controls  
(procedural and administrative)****Layers of Protection**

# Developing Performance Standards for Control Measures

Basis for design  
engineering standards  
and specifications

Detailed design

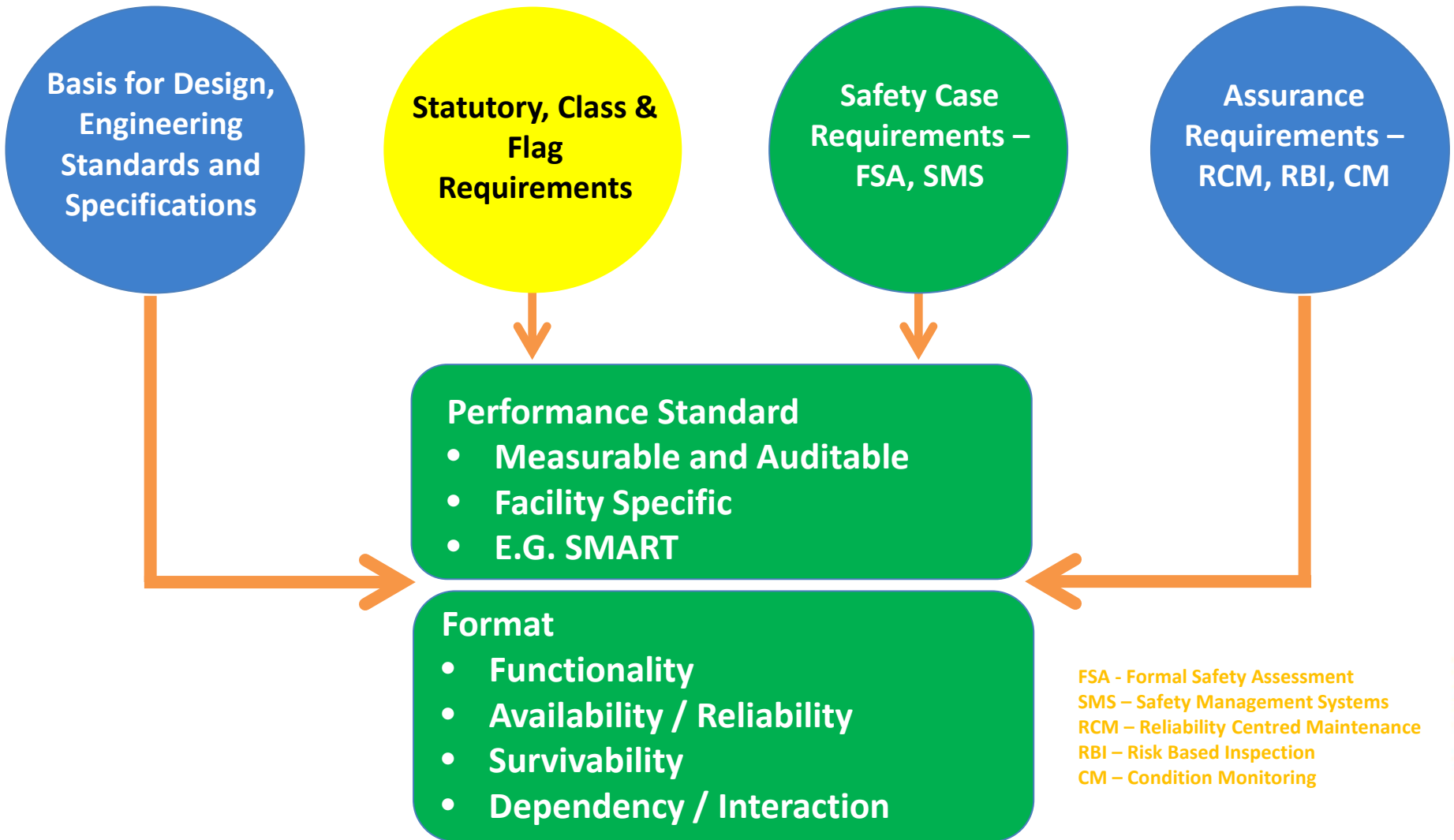
Control Measures

↕ Achieve ALARP

Formal safety assessment

Hazard identification  
Major accident analysis  
Fire and explosion analysis  
Escape, evacuation and rescue analysis  
Emergency systems survivability analysis

Performance  
Standards

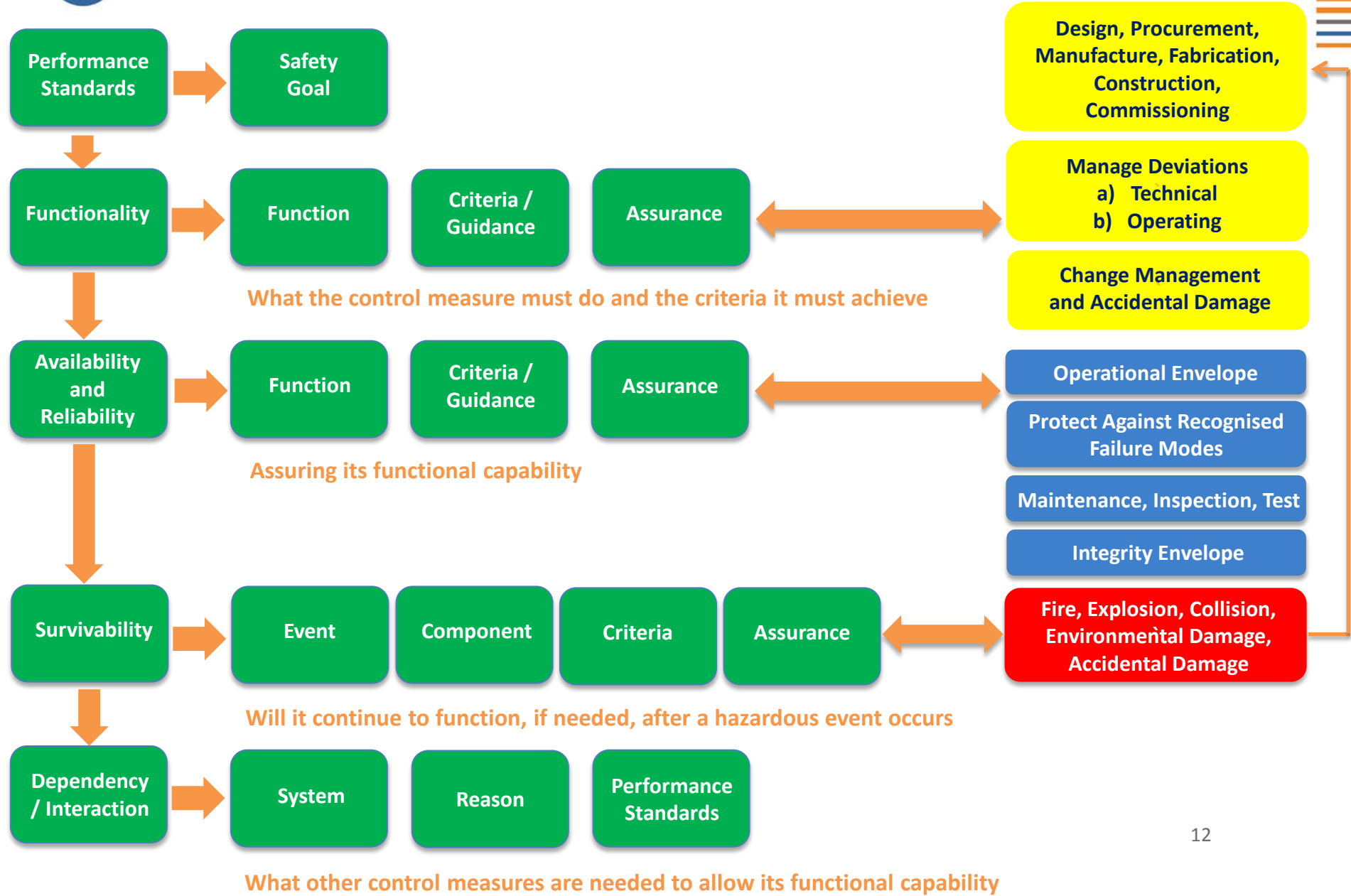


# Developing Performance Standards for Control Measures

- **Functionality** - What the Control Measure must do and the criteria it must achieve,
- **Availability / Reliability** - Assuring its functional capability
- **Survivability** - Will it continue to function, if needed, after a hazardous event occurs,
- **Dependency / Interaction** - What other Control Measures are needed to allow its functional capability,

## AND

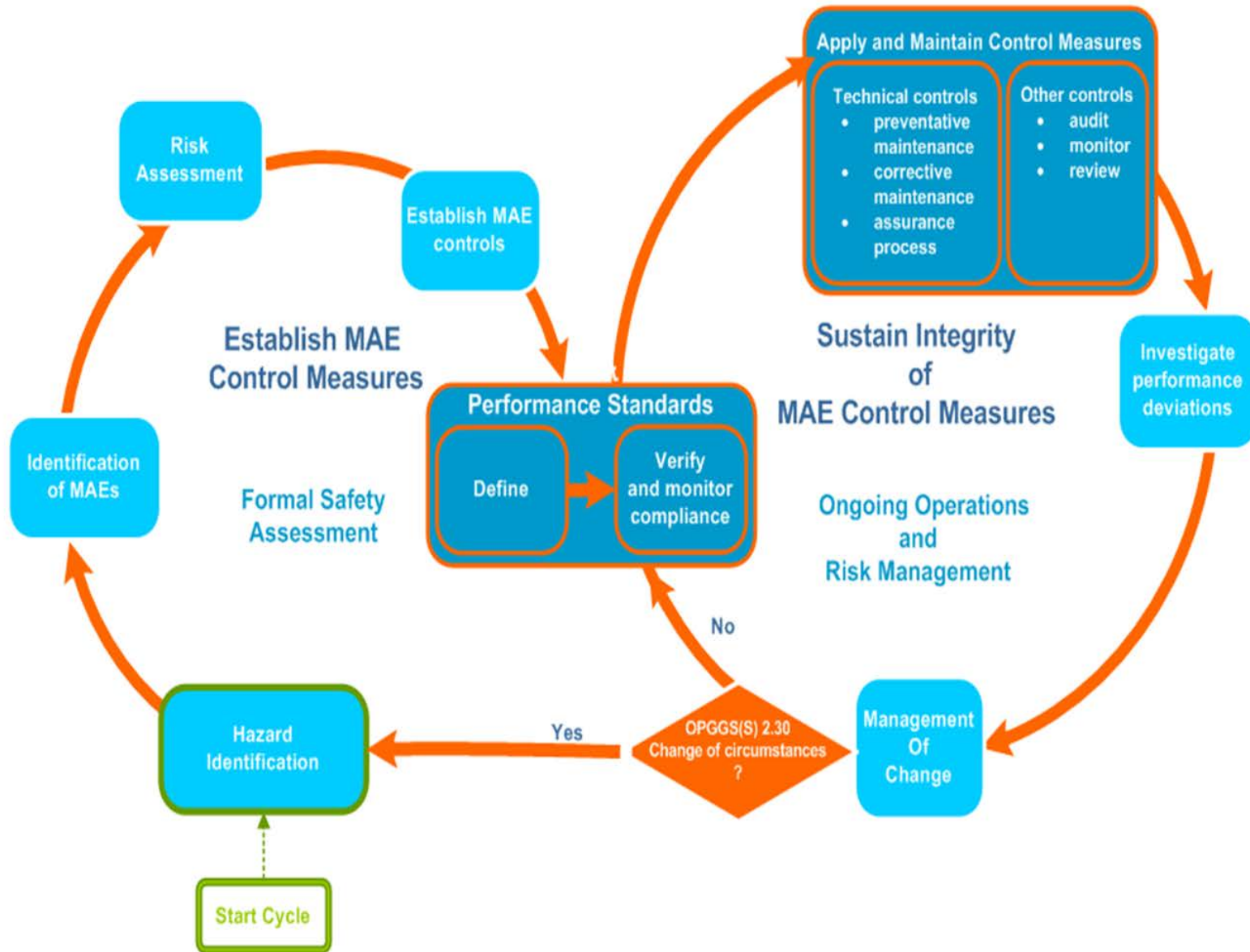
- How the above items will be/are 'Assured' e.g. Design/Technical Review, QA/QC, Maintenance, Inspection and Testing, Audits etc.

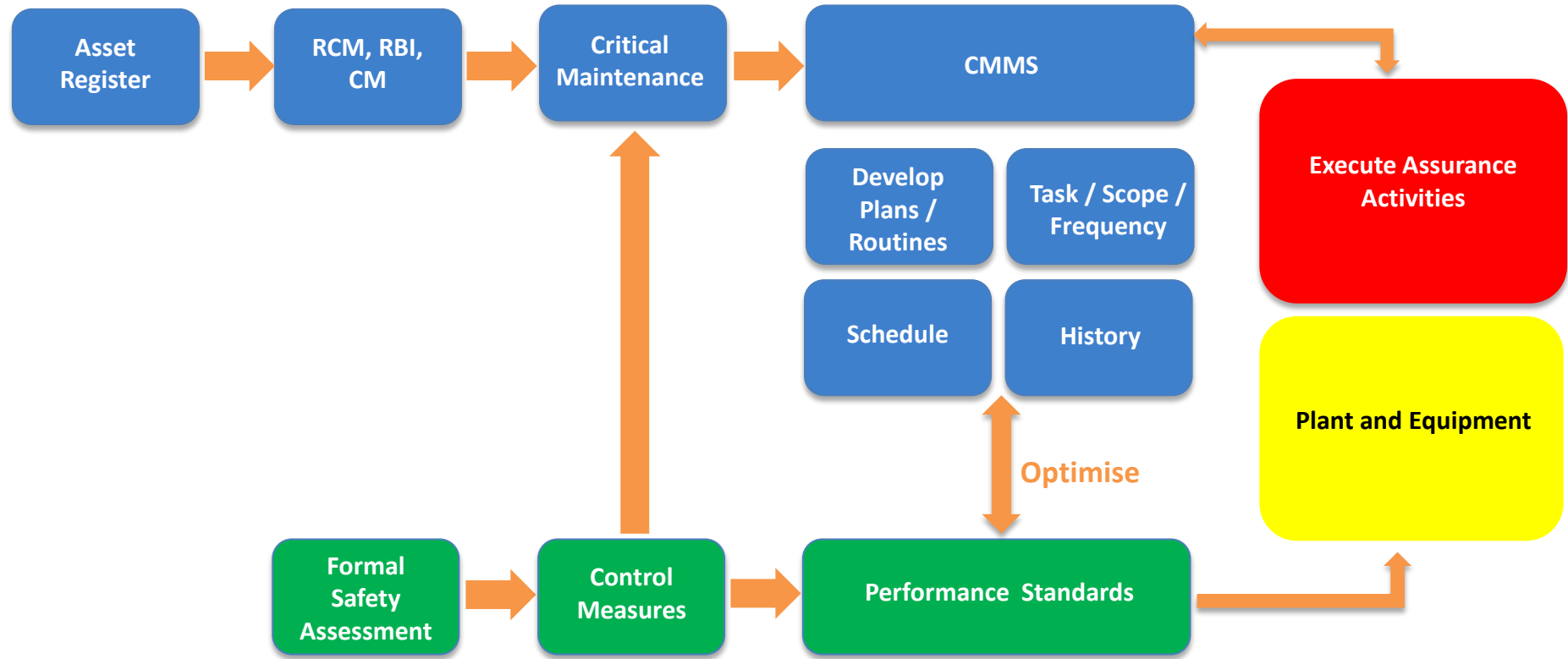




- Full functionality of control measure not defined e.g. start systems of emergency generators missing,
- Performance criteria not fully specified, thus difficult to measure e.g. closing requirement / time for temporary refuge fire dampers not specified,
- Referencing marine standards (Class / IMO) as the performance standard e.g. IMO MODU Code for active fire protection states “capacity of required pumps should be appropriate to the fire fighting service” i.e. no flow and pressure performance criteria specified.

- Assurance tasks not fully specified e.g. maintenance tasks for emergency switchboard not referenced,
- Not enough input from engineering discipline technical authorities – risk / safety engineers drive development.





**RCM** Reliability Centred Maintenance  
**RBI** Risk Based Inspection  
**CM** Condition Monitoring  
**CMMS** Computerised Maintenance Management System

- Performance standards not being aligned and optimised with assurance activities e.g. no GAP analysis and optimisation of maintenance management system,
- Assurance activities not testing and recording performance criteria e.g. deluge and sprinkler systems coverage not being adequately tested and recorded,

- Assurance activities not fully defined / referenced in performance standards e.g. key components of control measure assurance not in performance standards – UPS systems,
- Availability / reliability of control measure not being measured and assessed e.g. equipment uptime, equipment performance, equipment defect management, maintenance completed on time, maintenance backlog, maintenance deferral.

- **Technical**  
Degradation, Failure, Accidental Damage, Loss of Redundancy.
- **Operating**  
Operating Conditions, Environmental Conditions, Out of Service for Maintenance.
- **Manage Deviations/Technical Change**  
Design Review(Outside Original Design Envelope),  
Operational Review (Outside Originally Specified Operating Conditions).
- **Contingency Planning (Short Term Control Measures)**

- Monthly assessment of control measures performance,
- Annual review and assessment of control measure performance,
- Safety management system audit of management of control measures,
- Independent verification of control measures performance.



## Summary

Robust development and effective use of performance standards significantly contributes to the demonstration that control measures for the prevention and mitigation of major accident events are being appropriately and adequately managed

## Further Information

GN0271 - Guidance note on control measures and performance standards:

*NOPSEMA website* → *safety section* → *safety case section* → *safety case guidance notes*

# Any questions?