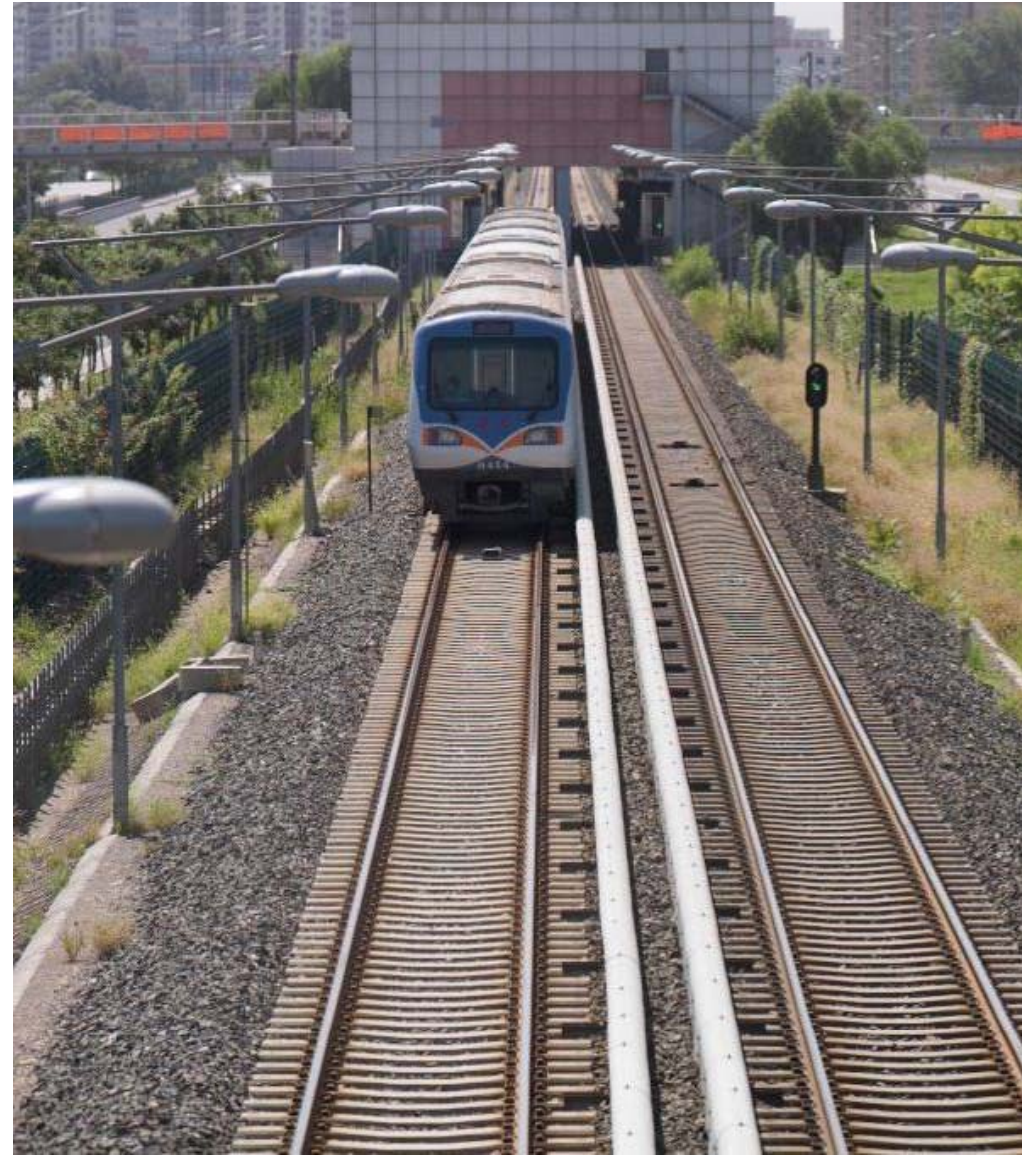


Lloyd's Register: Transportation

Competence Management for Safety Critical Roles

Andrea Har
Senior Consultant

Lloyd's Register Rail (Asia) Ltd.
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Agenda

- Major accidents in high reliability industries
- Why we need to manage competence?
- What is competence and competence management?
- Managing competence – Where to start?
- Who will be involved?
- Case Studies
- Conclusion

Lloyd's Register: Transportation

Kid controller: Boy directs JFK air traffic

Kid: “Jet Blue 171, clear for takeoff.....”

Pilot: “Clear for takeoff, 171”

Adult: “This is what you get, guys, when the kids are out of school”

Pilot: “Wish I could bring my kid to work”



Major accidents (1) Esso Longford Gas Explosion

- Esso Gas Plant, Longford, Australia, 1998
- Explosion, 2 fatalities, 8 injuries



“This is probably due to the lack of knowledge to operate a hazardous process...”

Major accidents (2) Daegu Subway Fire

- Daegu Metro station, South Korea, 2003
- Arson fire, >198 fatalities, >147 injuries



“Apart from the ineffective fire safety design, there was a lack of emergency and contingency planning, Control Centre Operator and Train Driver failed to address the emergency situation as required in their roles.....”

Why do we need to manage competence?

- At organization level
 - Reduce risks
 - Satisfy legal and regulatory requirements
 - Meet the organization's business objectives
- At staff level
 - Know what competence is expected of them
 - Receive appropriate training, development and assessment
 - Have appropriate experience
 - Maintain or improve their competence over time

What is competence?

- Competence is the ability to undertake responsibilities and to perform activities to a recognized standard on a regular basis. Competence is a combination of practical and thinking skills, experience and knowledge.

Source: Developing and Maintaining Staff Competence, HSE (2002), ISBN 0 7176 17327

What is competence management?

- Competence management is a proactive and systematic process, which integrates a number of activities including: recruitment & selection, training & development, qualification, continuous assessment and performance monitoring.

Managing competence - where to start?

Establish requirements for the CMS

- identify activities and assess risks
- select standards

Audit and review the CMS

- verify and audit the system
- review and feedback

Competence Management System (CMS)

Design the CMS

- develop procedures and methods
- decide how to meet the standards
- establish requirements for training, development and assessment
- maintain managers' competencies

Maintain competence

- monitor & reassess staff performance
- update the competence of individuals
- manage sub-standard performance
- keep records

Implement the CMS

- select and recruit staff
- train, develop and assess staff
- control activities undertaken

Who will be involved?

Key Steps in CMS	CMS specialist	Safety	O&M	Training	HR
Establish requirements	L	S	S	S	S
Design	L	S	S	S	S
Implement and maintain					
•Recruit & select	A	S	S	A	L
•Train & develop, qualification	A	S	S	L	S
•Control & on-going assessment	A	S	L	S	S
Audit and Review					
•Internal	A	L	S	S	S
•Independent	L	S	S	S	S

Index:

L – Lead, S – Support, A – As needed

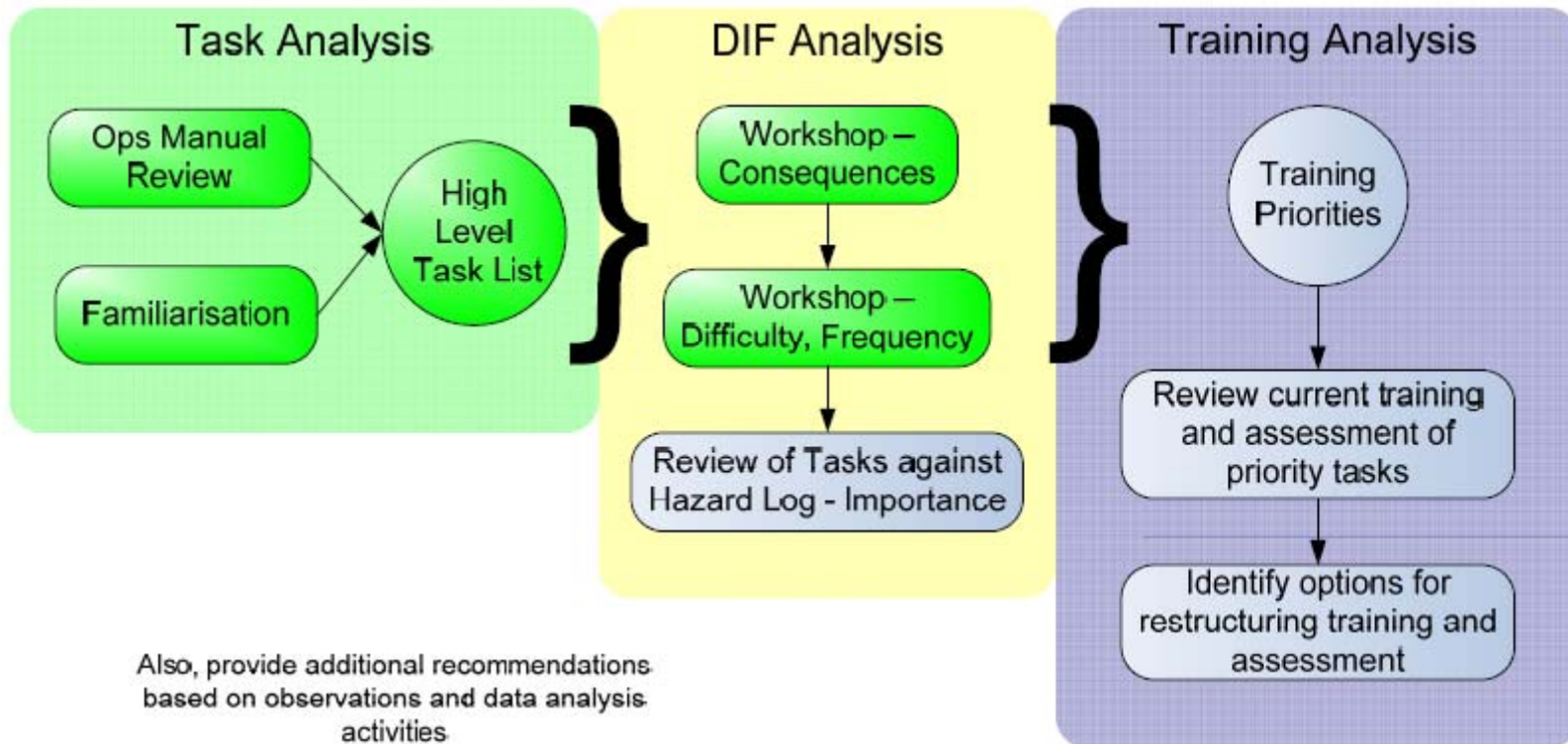


Case study (1)

- **Practical example to look at one of the steps in “Design the CMS”**
- **Scope of work:**
 - Establish requirements for training of key roles in high reliability industry
 - Tools: Risk Based Training Needs Analysis (RBTNA)
- **The need for the work:**
 - Potential to lose key operational staff
 - Modify existing training programs to fast track training for key roles

Case study (1)

- RBTNA Process



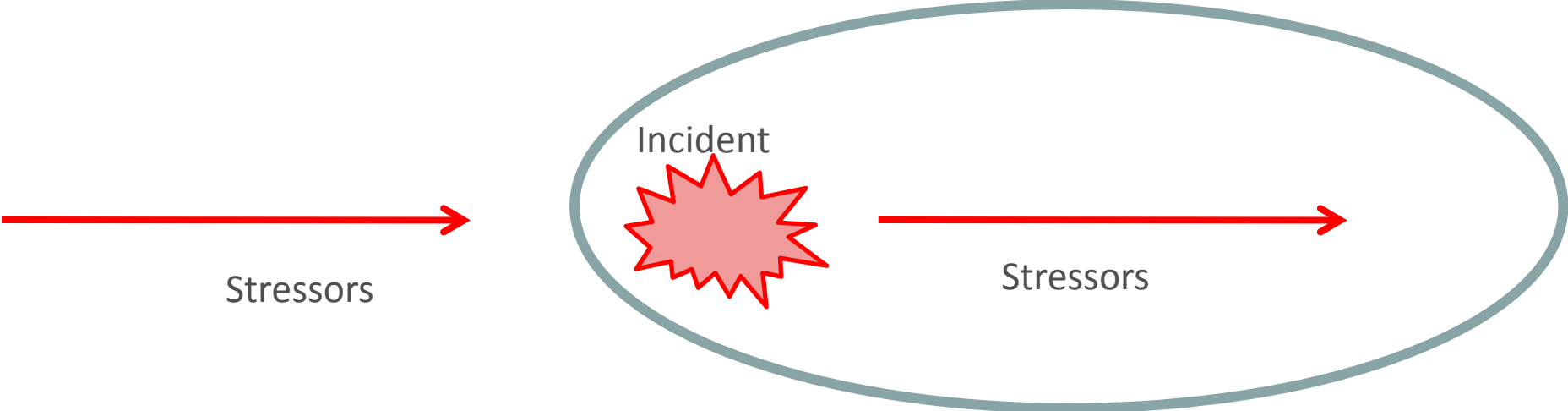
Case study (1)

Outcome and benefits:

- Assist in making risk-based decision to review training programs & allocate training resources
 - Reduce training time associated with modules that do not contain high priority tasks
 - Optimize training approaches used for high priority tasks (e.g. practical training)
- Generate strategies to reduce the impact of potential loss of staff through the review of the linkages between tasks, risk and the existing programs
 - Streamline the current requirements for staff to convert from other roles
 - Offer opportunities for career progression
 - Develop graduate program

Case study (2)

- **Example to look at the step in “Implement the CMS”**
- **Training solutions for Train Crew in Train Evacuation**



Learning Styles







Emergency evacuation of a train in a tunnel

Scenario 1

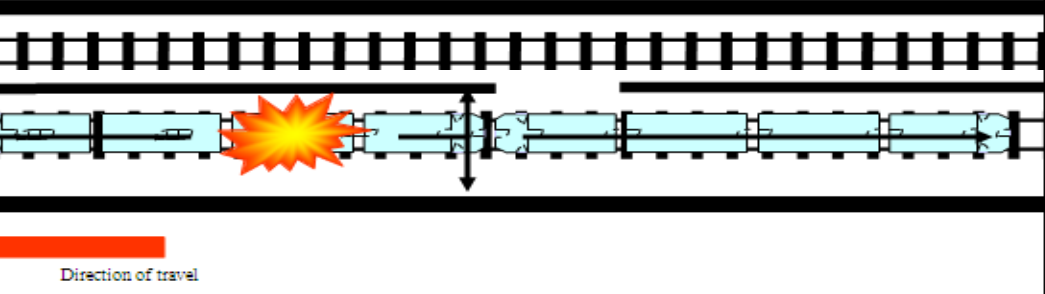
The 3rd car is disabled. An explosion has occurred between the guard and driver.

The black arrows indicate the possible routes of egress for passengers.

Considerations;

- The driver would control egress from car 1&2 through the terminal end doors and both side crew doors.
- The guard would control egress from cars 3&4 through the crew doors and the remainder of passengers in cars 5 to 8 through the terminal end door.

Note; When evacuating through the crew cab doors, an assessment would need to be made as to the ability of the passengers to negotiate the crew stairs. Volunteers could possibly assist others at the base of these stairs. Crew should make an announcement where possible indicating the correct method of negotiating these steps and the hazards. (i.e. climb down backwards like a ladder and awareness of the fact they are slightly recessed from the body of the train).

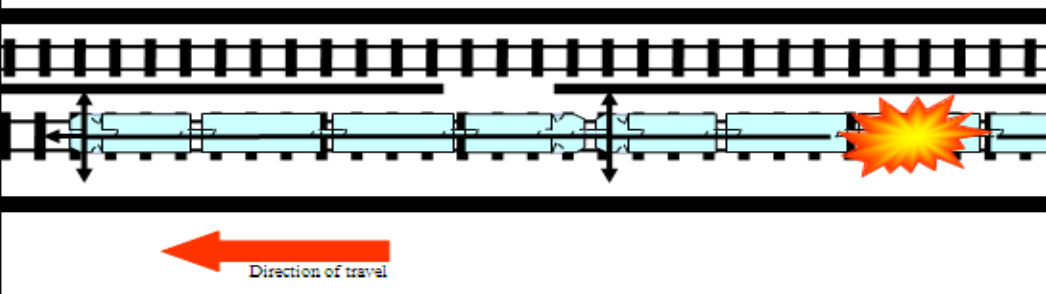


Emergency evacuation of a train in a tunnel

Scenario 2

The 7th car is disabled. An explosion has occurred behind the guard.

- Guard to open the crew door between car 4 and 5.
- Guard to evacuate passengers from cars 5 and 6 through crew doors. Passengers unable to exit via crew stairs to move towards the leading car.
- Driver and guard to evacuate cars 1 to 4 through the terminal end door in leading car and through the crew doors.
- There is a possibility the guard (or someone else) may be able to access the rear car and activate the EDR. If this is not possible, Emergency Services should be advised of the need to evacuate this car first.







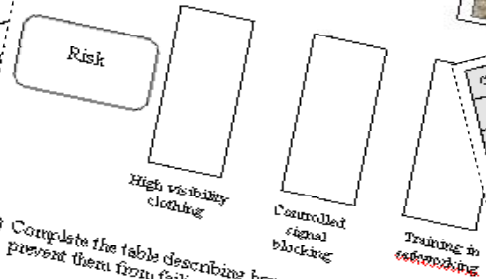


AMALGAMATION

Instructions: You assess the trainee completing an entire process, indicate when the following evidence has been demonstrated. This should include demonstration of the procedure and correct responses to questions to demonstrate learning knowledge. Where any competencies have not been demonstrated, develop an action plan with the candidate for further assessment at a later date and write the action plan below where appropriate. If you are assessing a trainee who has been assessed in a previous attempt, indicate in the action plan field that they are more competent (assuming this is true) then print and sign your name there.

- Can the trainee complete the task satisfactorily? Yes
- Following relevant procedures for the train they are amalgamating? For example: correctly apply brakes, set marker lights, and conduct a continuity test.
- Plan and organise the task? For example: correctly apply following relevant procedures for the train they are amalgamating? For example: correctly apply brakes, set marker lights, and conduct a continuity test.
- Anticipate and/or solve problems? For example: what to do if the traines disconnects correctly or if the continuity test failed.
- Communicate effectively? For example: respond to and give instructions to the other crew members in the task and give sufficient information. For example, report bell signals and complete train status reports.
- Work effectively with others? For example: wearing appropriate external protective equipment.
- Comply with OHSS requirements? For example, wearing appropriate external protective equipment.
- Follow all relevant safety requirements. For example, wearing appropriate external protective equipment.
- Transfer learning to other conditions? For example, if amalgamating a train you should be able to amalgamate in any other conditions. This assessment must test your competence in any other conditions.
- Action plan (if required)

2. In this picture, you can see two workers in the danger zone. There is a risk that they could be struck by a passing train and the consequences of this risk could be catastrophic. Some of the safety defences that protect the workers are listed in the Reason model below.



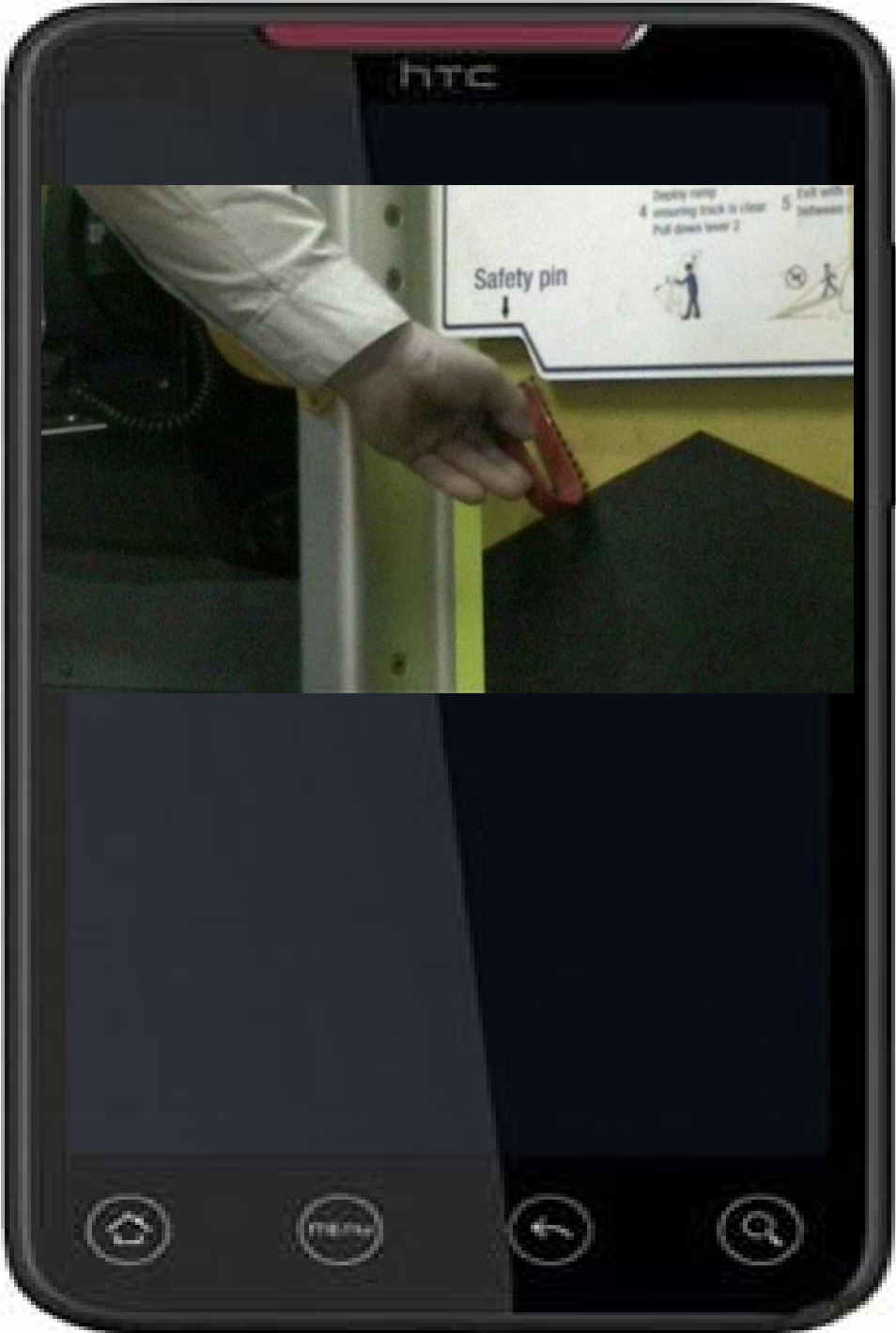
3. Complete the table describing how each of the safety defences could prevent them from failing (and therefore avert disaster).

Defence	How it could fail
High visibility clothing	
Controlled signal blocking	
Training in amalgamating	
Audible warning devices fitted to trains	

Candidate name:	LtO Major Improvement project First reaction training
Assessor name:	Electronics System
Course Name & Code:	Electronics System
Functional System:	
Date Assessment Commenced:	Main air compressor test (ET)
References (Procedures):	The task found on randomly selected as part of the activities of an individual competence. The task is to set the gas flow and understand the need for the correct instructions and other instructions to ensure the system is set up correctly. The assessment is to ensure the candidate can set up the main air compressor and understand the need for the correct instructions and other instructions.
Instructions:	

	Performance Test Satisfactorily				
	Yes	No			
Component set ET List	<input type="checkbox"/>	<input type="checkbox"/>			
Perform the component test as listed in the ET List	<input type="checkbox"/>	<input type="checkbox"/>			
Oil filter name and checked as specified and a new filter is added	<input type="checkbox"/>	<input type="checkbox"/>			
Oil filter name and checked according to procedure	Yes	No			
Oil temperature and pressure checked according to procedure	<input type="checkbox"/>	<input type="checkbox"/>			
Explain oil	<input type="checkbox"/>	<input type="checkbox"/>			
Other component being performed according to IPR	<input type="checkbox"/>	<input type="checkbox"/>			
Explain component being performed according to IPR	<input type="checkbox"/>	<input type="checkbox"/>			
What are you looking for when setting the oil filter?	<input type="checkbox"/>	<input type="checkbox"/>			
What are the pressure is required in the ET to be in the component test?	<input type="checkbox"/>	<input type="checkbox"/>			
What is your auditory warning device fitted from the tank?	<input type="checkbox"/>	<input type="checkbox"/>			
What is the maximum allowable noise level from the component test?	<input type="checkbox"/>	<input type="checkbox"/>			
Training Coaching and Re-assessment Follow-Up Action Plan					
Summary	Target Date	Trainer Check	Assess	Assessed	Results Comparison
	Development required - key details:				Yes No







In summary....

- We need a proactive and systematic way to manage competence for safety critical roles
- Adopt risk-based approach to manage competence and allocate adequate resources to get the optimal outcome
- **First Step: Develop a framework for competence management**

Thank You for your attention!

Questions
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For more information, please contact:

Andrea Har

Senior Consultant, Transportation

Lloyd's Register Rail (Asia) Limited
Suite 3501 China Merchants Tower
Shun Tak Centre
168 - 200 Connaught Road
Central, Hong Kong

T +852 2287 9347

E andrea.har@lr.org

W www.lr.org/transportation

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