

# MARSHALL

A E R O S P A C E



**22<sup>nd</sup> April 2008**

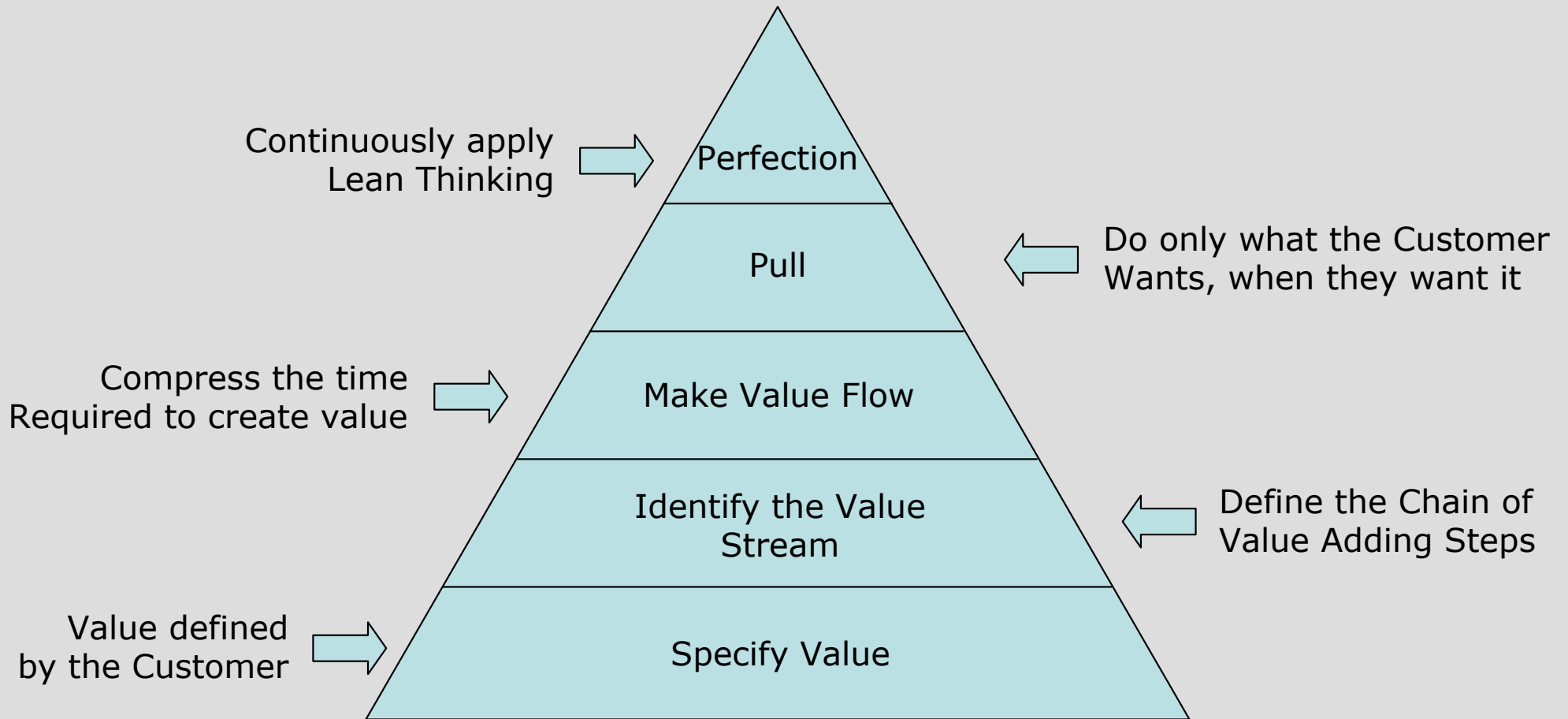
Presentation by  
Martin Broadhurst  
CEO  
Marshall Aerospace

# LEAN Thinking – the five steps

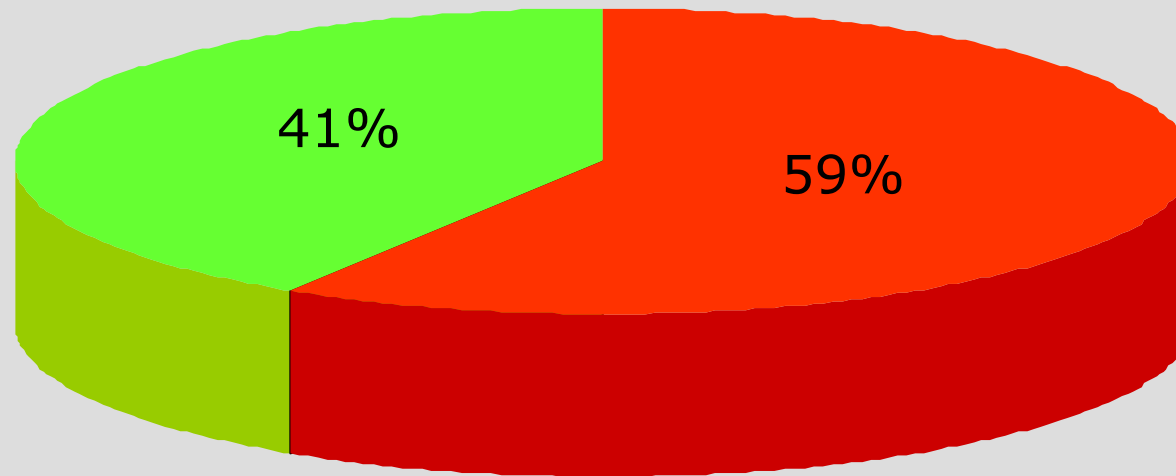
## ■ Work and Waste

- ➔ Value Added – Any process that changes the nature, shape or characteristics of the product, in line with customer requirements
- ➔ Non-Value Added – Any process which is non-value adding but is necessary under current conditions (e.g. inspection, equipment maintenance, etc)
- ➔ Waste – All other activity

# LEAN Thinking – the five steps



# Data capture Results



■ Value Added

■ Non Value Added and Waste

# LEAN Tools and Techniques

- Over Production
  - ➔ *Making more than the customer requires or before they want it*
- Inventory
  - ➔ *Raw material, work in progress and finished goods*
- Transportation
  - ➔ *Excessive movement of parts, double handling*
- Process
  - ➔ *Inappropriate processes*
- Idle Time
  - ➔ *Machine or operator waiting*
- Operator Motion
  - ➔ *Excessive walking, bending, lifting, etc*
- Bad Quality
  - ➔ *Making scrap, concessions or reworking*



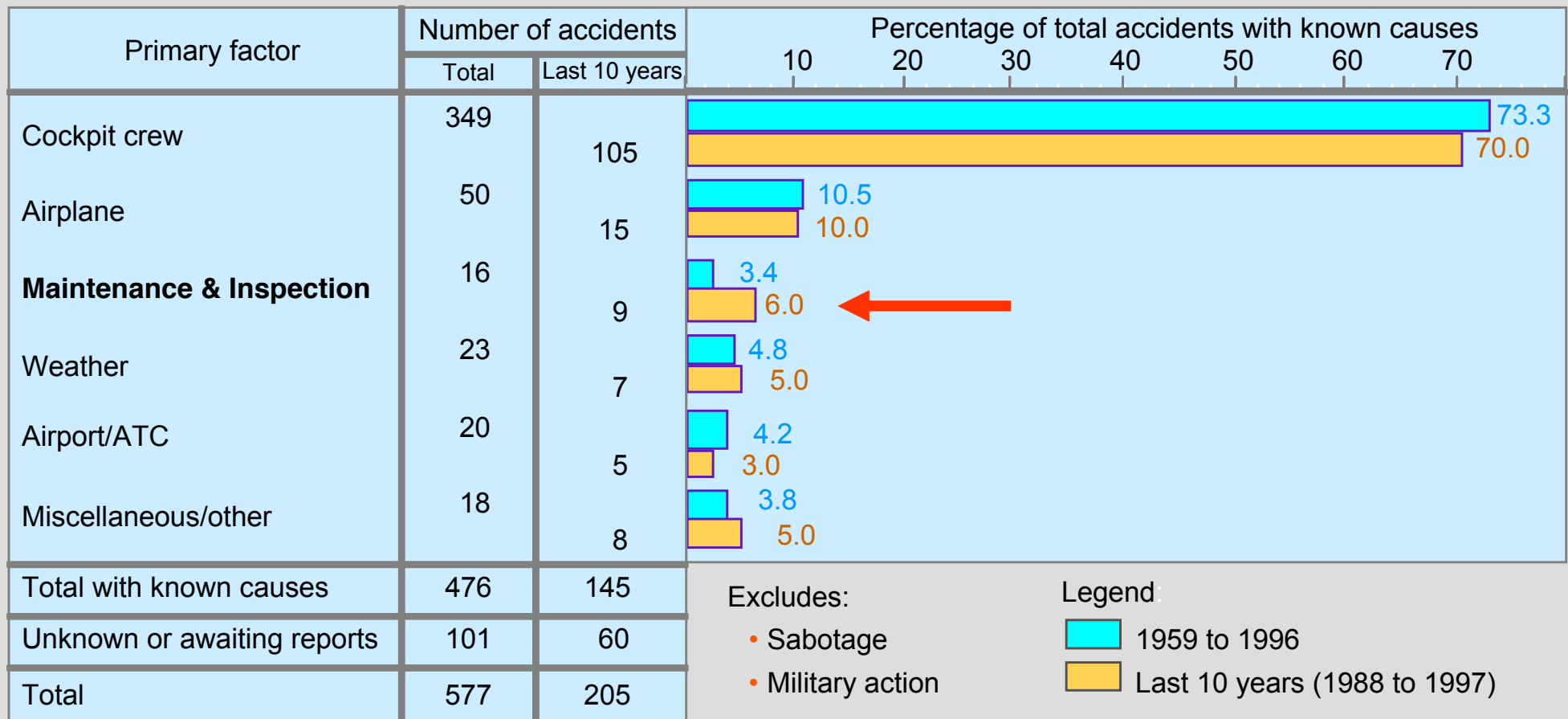




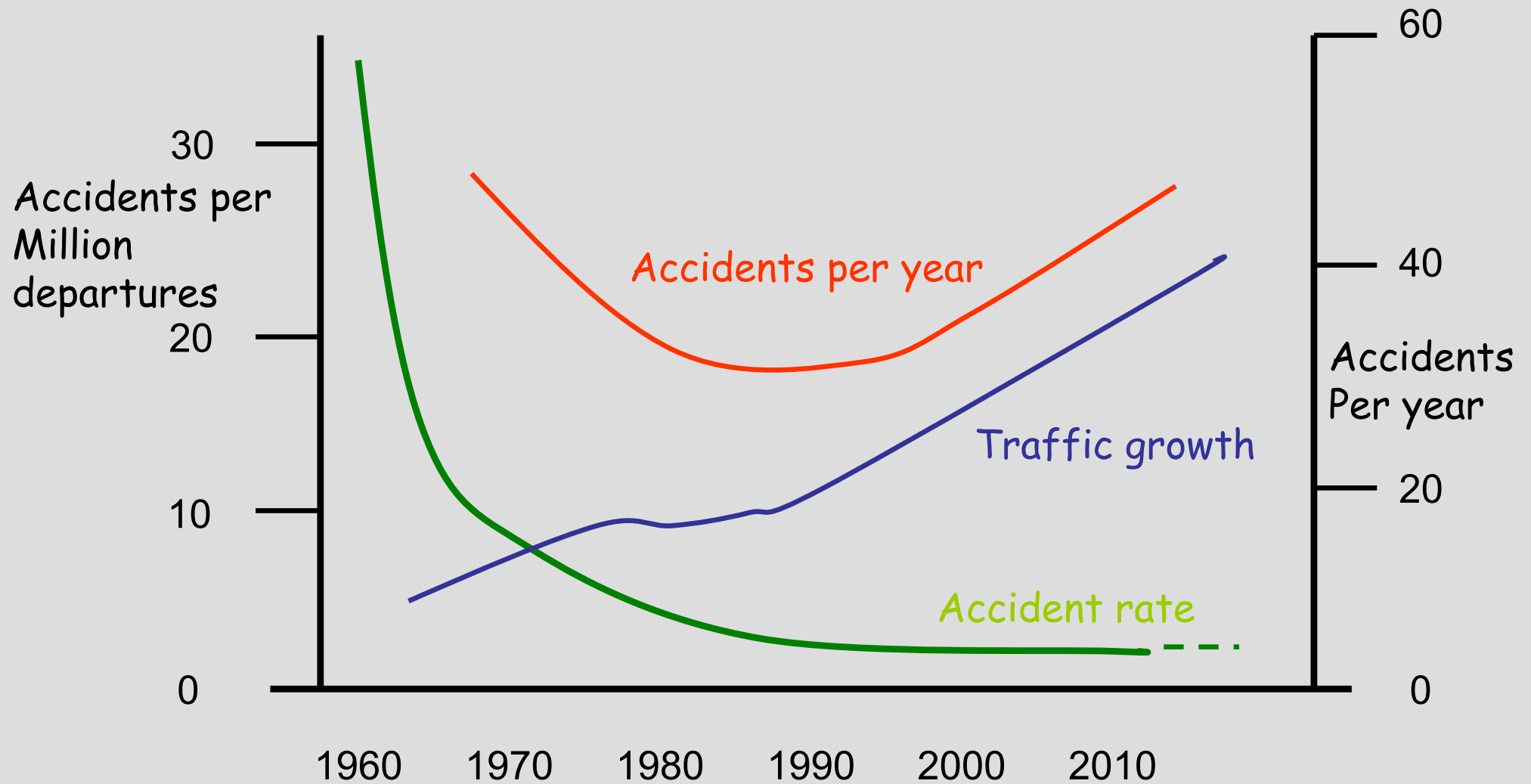


# Maintenance Error as a Primary Cause

## Hull Loss Accidents - Worldwide Commercial Jet Fleet

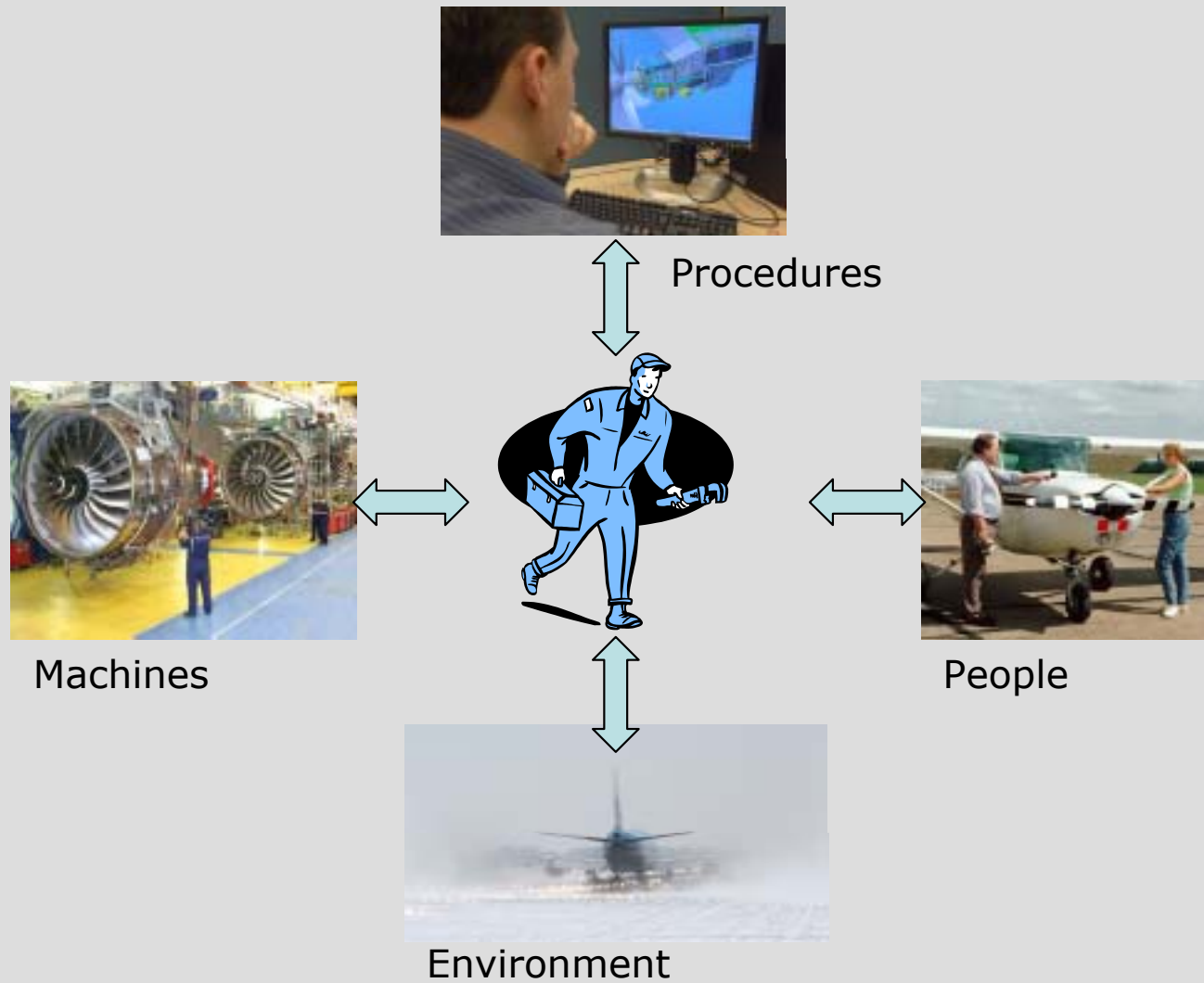


# Annual Accident Statistics



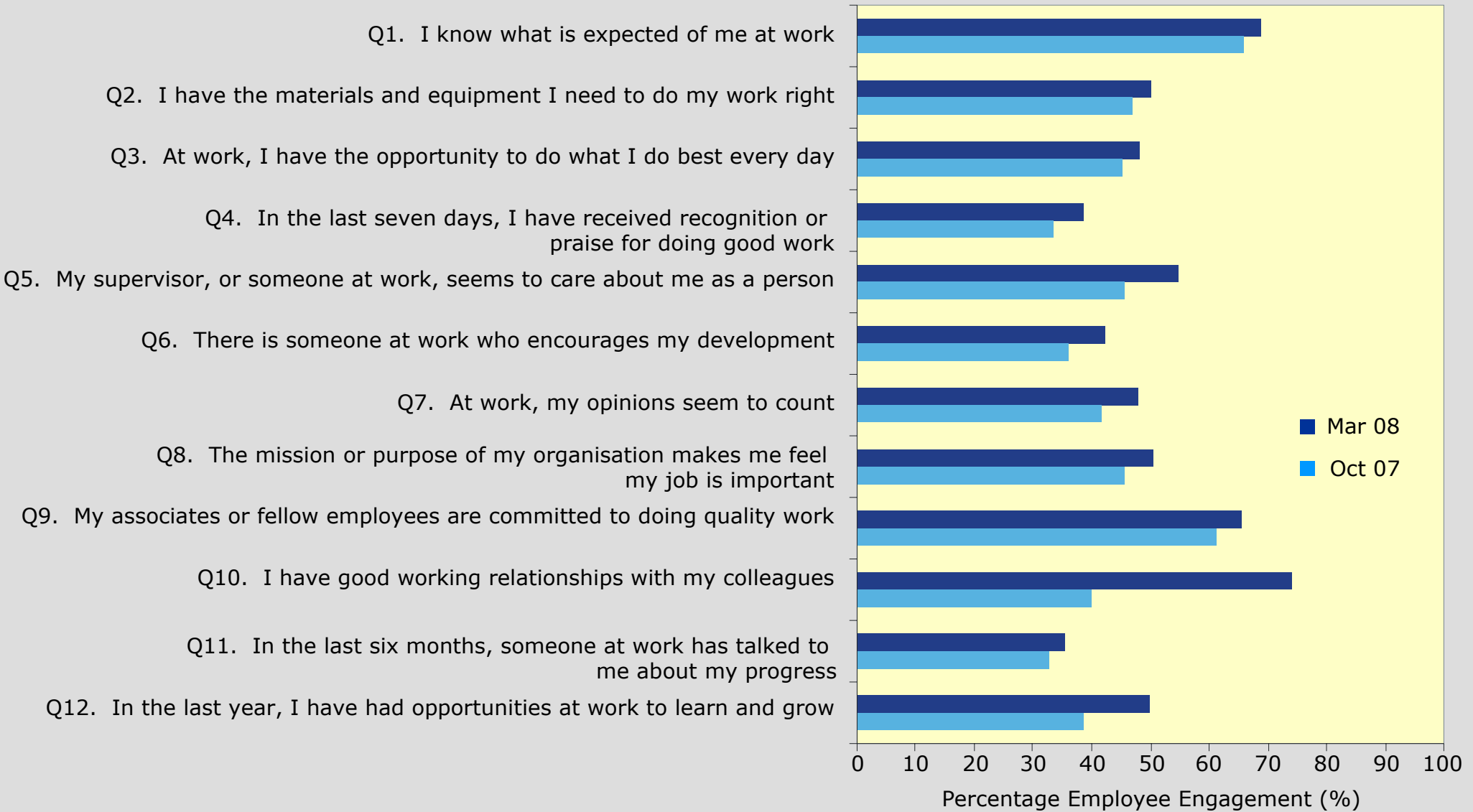
Source:- Rolls Royce aero engines

# Human Factors is the interface between



# Key Performance Indicator (KPI)

## Employee Engagement for Production – March 2008



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