

How should industry make decisions affecting safety?

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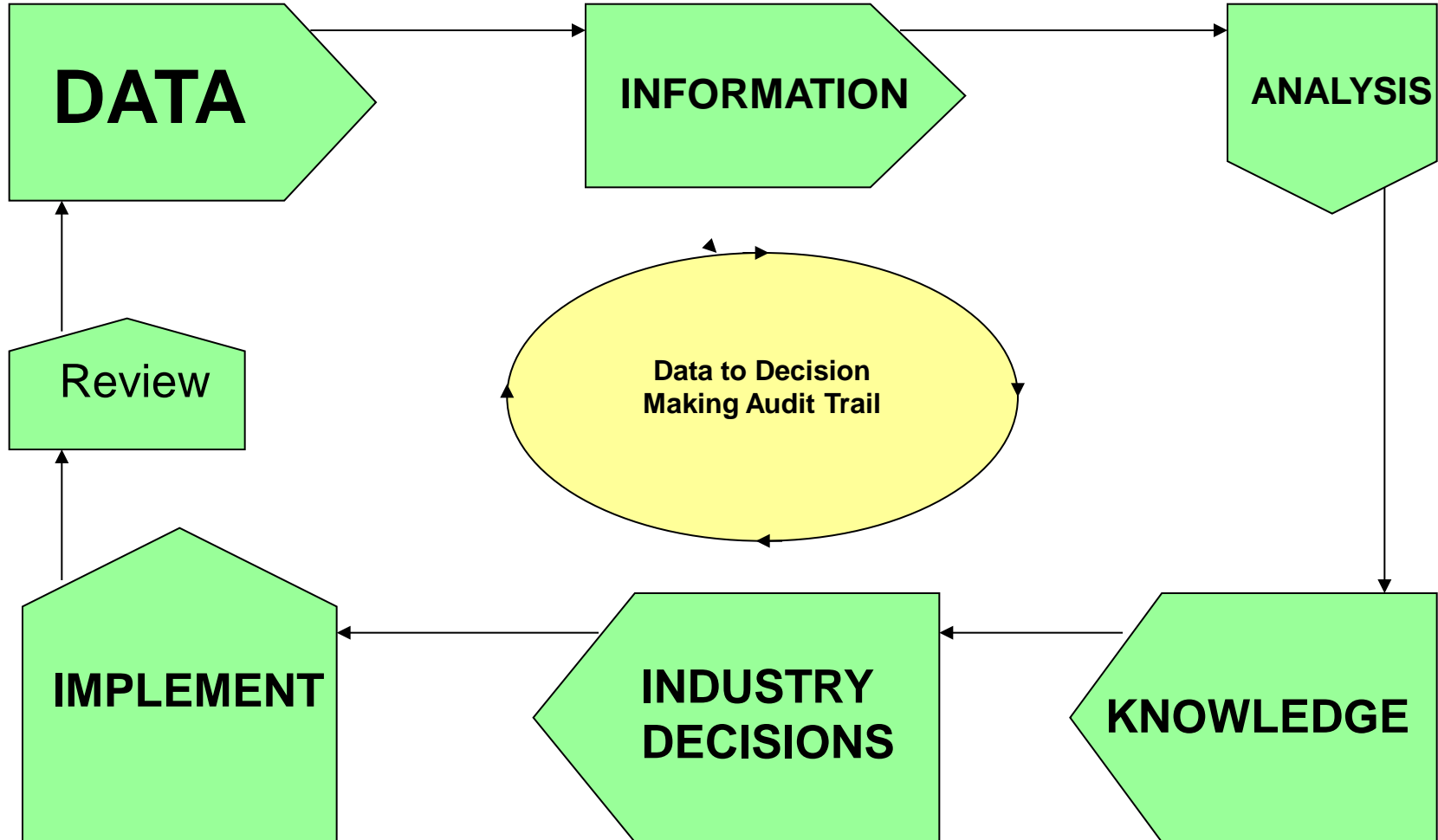
RSSB

29 September 2009

EU Safety Directive requirement is to maintain and, where reasonably practicable, improve safety

National legislation

Decision-making audit trail



Safety Management Information System

- Collects data from individual events across sector

Accidents

Investigations and reports

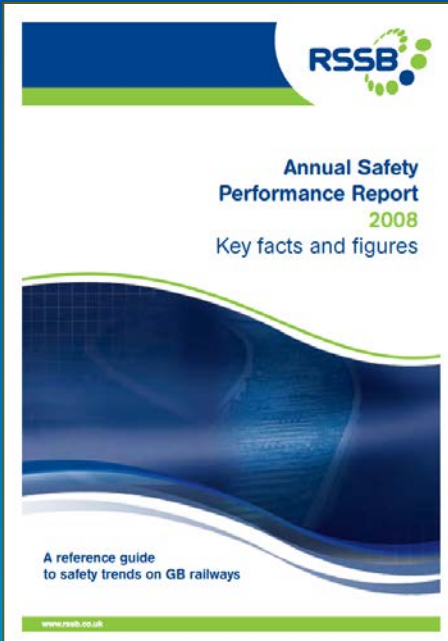
R&D

- Explores – behaviour – engineering – operations

CIRAS

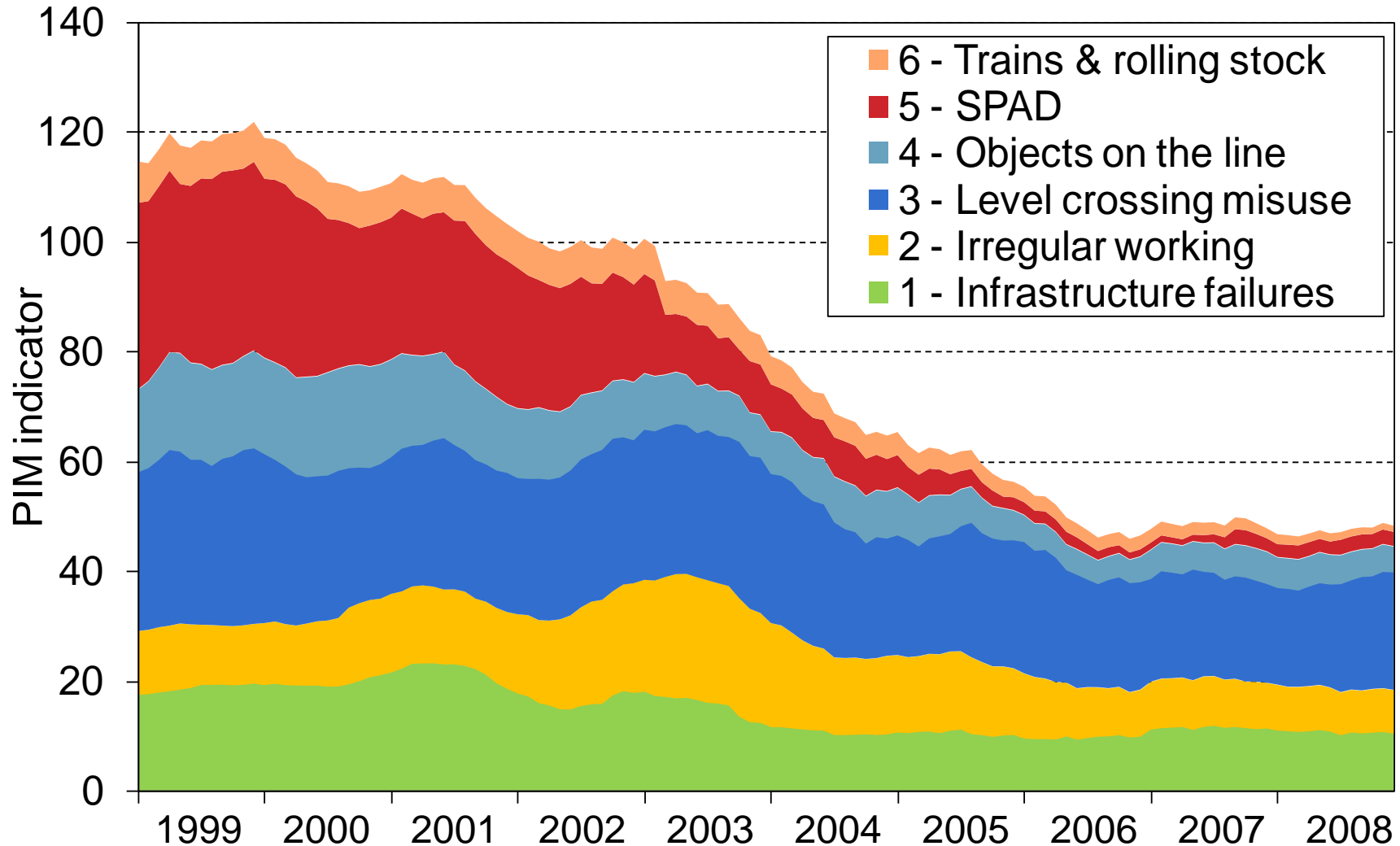
- Confidential Incident Reporting Analysis System

- Monthly statistics of key safety measures
- Monthly reports on Signals Passed at Danger
- Periodic Reports on special topics (level crossings etc)
- Annual Report / compendium of safety data



- We look at 6 precursors of **train accident risk**

Precursor Indicator Model



- 120 hazardous events - frequency and consequence
- Enables rail companies to benchmark their risks and identify areas for action
- Enables government to set **risk based** rather than performance based targets
- Covers 99% of residual risk on the railway

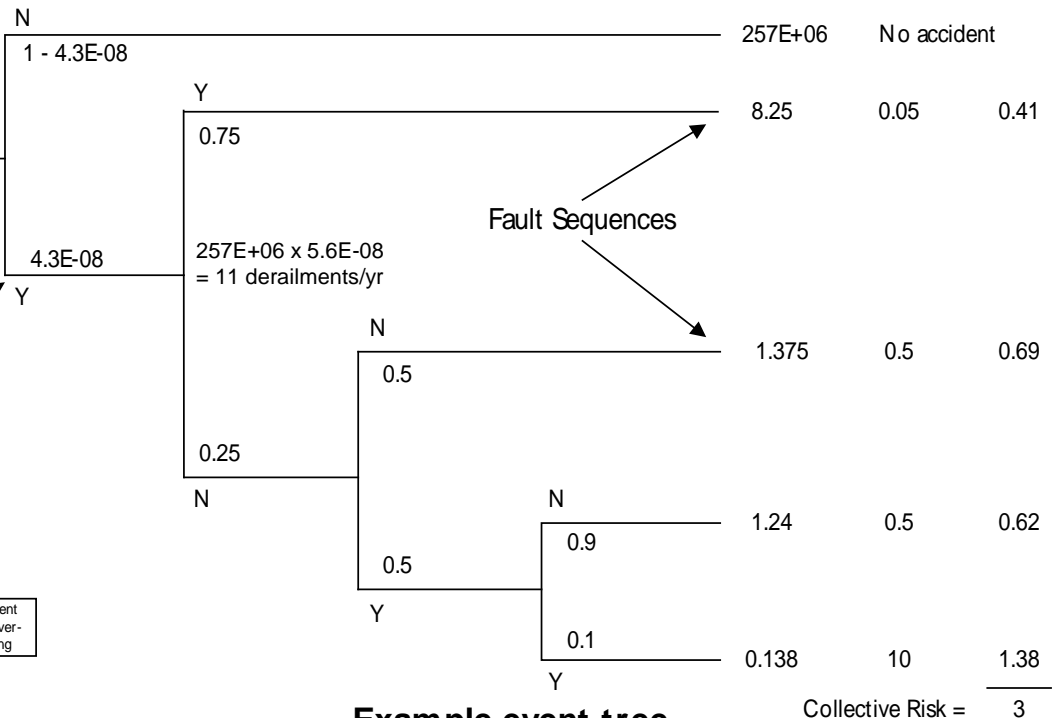
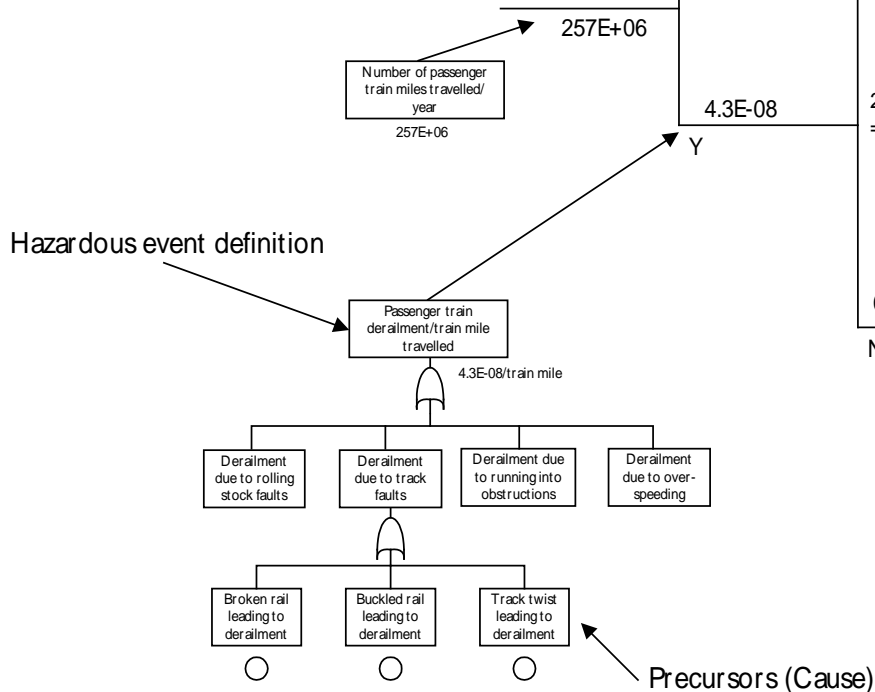
Fault and event trees



Escalation factors

Number of train miles travelled/year	Probability of derailment/train mile travelled	Does train maintain clearances? Y/N	Does train obstruct an adjacent line? N/Y	Is there a collision with train on the adjacent line? N/Y	Fault Sequence Frequency (Events/yr)	Con-sequences (Eq fatalities/Event)	Risk (Equivalent fatalities/yr)
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Example fault tree (not fully developed)



Example event tree (not fully developed)

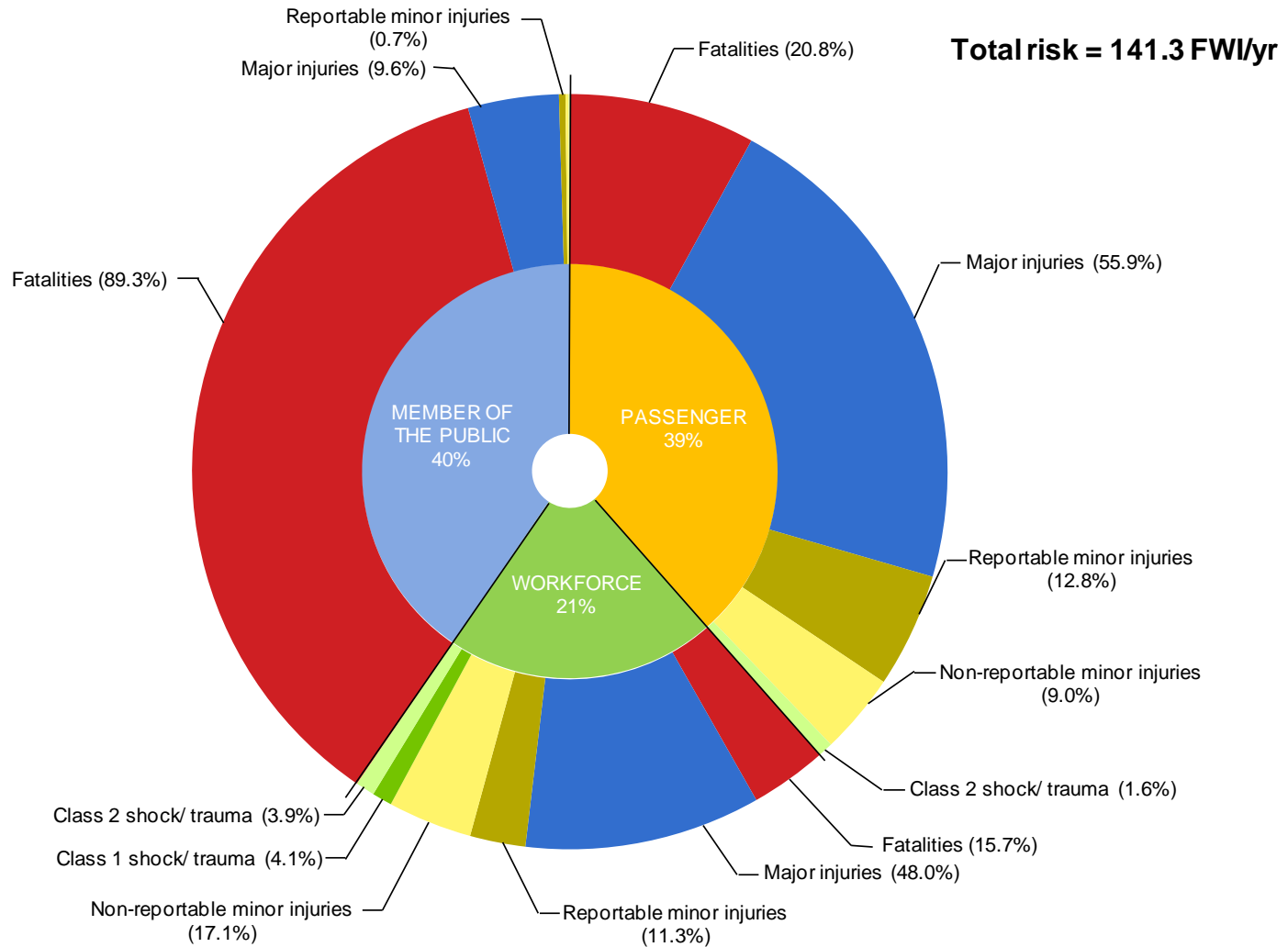
- Highest risk of train accidents is from level crossings
- Overall system risk has fallen over the years
- The industry understands its risks (and has effective measures to address them)
- Risk to the public is greater than risk to workforce or passengers
- Frequency and severity of accidents has been reducing

Risk to passengers in all train accidents has fallen by more than 80% in less than ten years

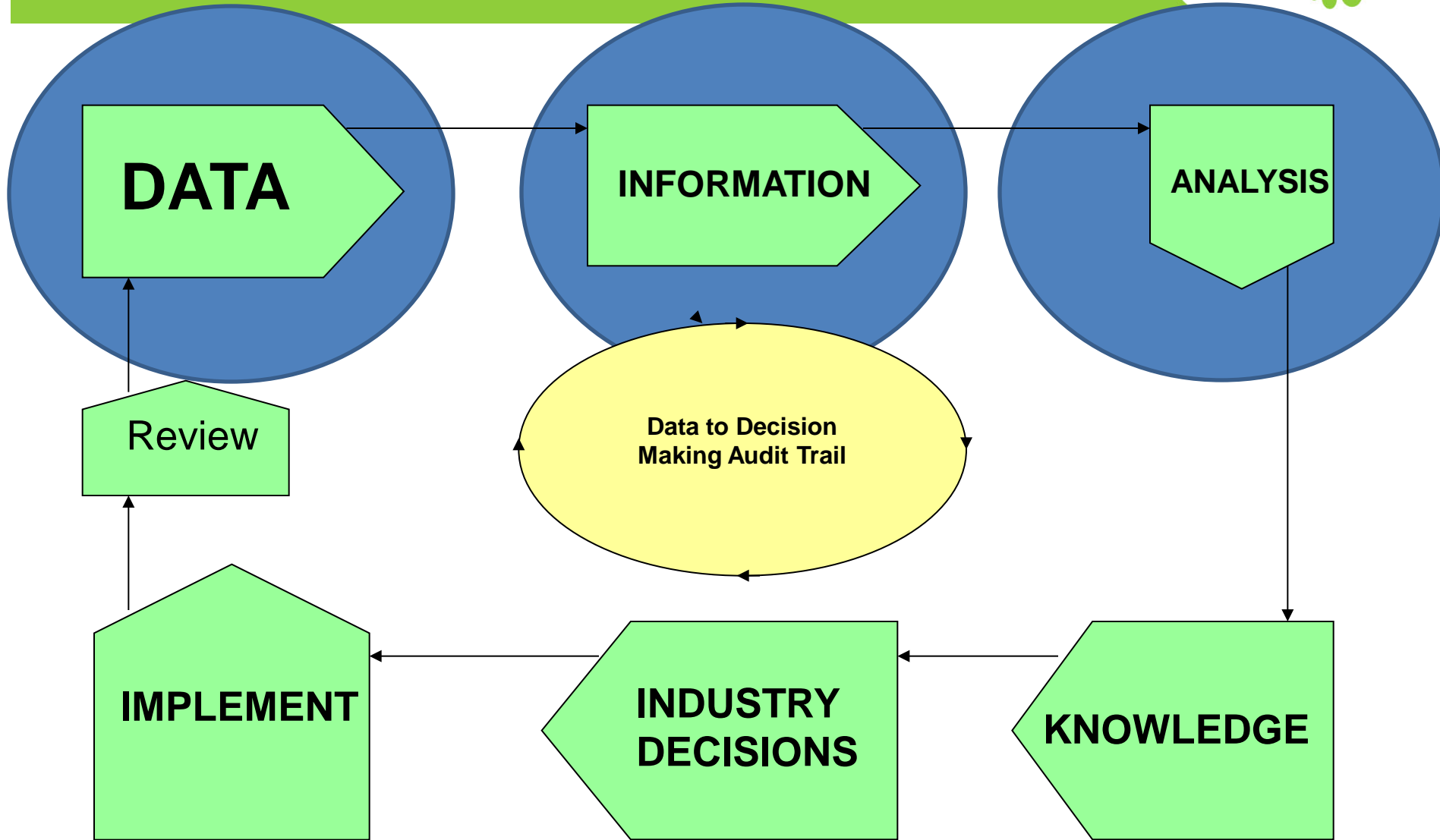
Modelled risk of fatality in a train accident has reduced from 0.26 per billion passenger kms per year in 2000 to 0.045 per billion passenger kms per year in 2008

Source: RSSB Safety Risk Models (Version 1 2000 and Version 6 2009)

Total risk on the railway



Decision-making audit trail



‘Taking Safe Decisions’:

- Product of research and consultation
- Think Tank - industry experts, regulator and government
- endorsed by industry through RSSB Board
- complementary to, and consistent with, safety regulators guidance

- Operators decisions are taken for legal and commercial reasons
- Legal duty to deliver safety So Far As Is Reasonably Practicable
- Whether or not something ensures safety SFAIRP is a judgement based on:
 - Good practice,
 - Risk Assessment and Cost Benefit Analysis (sometimes)
- The SFAIRP judgement is based on collective risk and net costs
- Other factors part of a wider business case but not the SFAIRP judgement

- ‘Societal concern’ about accidents is for government
- What should and should not be included in cost benefit
- Decisions are always based on judgement – not decided by CBA
- Make decisions consciously and record them
- The Tolerability of Risk triangle described in HSE guidance is not part of operators decision criteria

- Removal of fire extinguishers from passenger vehicles
- Removal of signal post telephones when GSM-R is fitted
- Axle Counters or Track Circuits
- Fit new sanders or improve driver training
- Length of walking route for drivers
- New examples (not in the literature)
 - Taking window hammers out of trains
 - All non breakable windows
 - Train Horns – reduction in sound levels and times of use

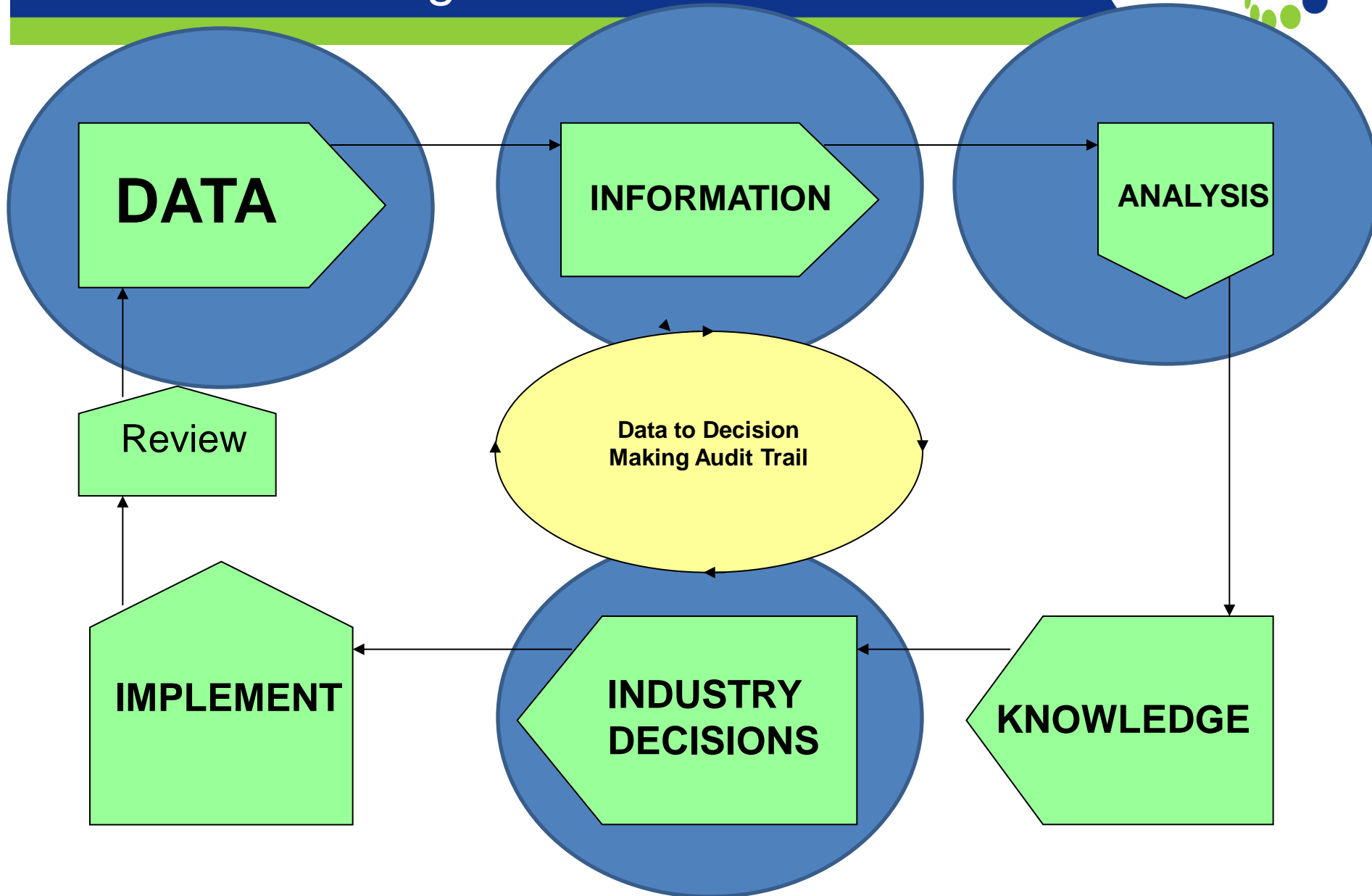
- Taking Safe Decisions is on the RSSB website:

http://www.rssb.co.uk/safety/safety_strategies/sdmoukr.asp

- Safety Regulator (ORR) has published guidance for their inspectors on how to undertake CBA in support of safety related decisions. This is complementary to TSD, although written for inspectors rather than the industry
- The ORR guidance is available on their website

<http://www.rail-reg.gov.uk/server/show/nav.1118>

Decision-making audit trail



What is RSSB?



- Set up in April 2003 as a not-for-profit company
- Owned and funded by major stakeholders in the rail industry, independent of any one party
- Approximately 250 employees covering a range of technical and business disciplines

Working with our industry partners our purpose is to:

- Where reasonably practicable, continuously improve safety
- Drive out unnecessary cost
- Improve business performance

Thank you

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