
Safety Performance Indicators in the Explosives industry

Neil Morton

HM Chief Inspector of Explosives, Great Britain

XVI SAFEX Congress 2008, Madrid, 29 May 2008

Safety performance indicators (SPIs) in the explosives industry



- background: why we are bothering
- the 2-pronged approach
 - Inspection Ratings
 - Process Safety Performance Indicators
- where we are now
- opportunities & future developments

Background (1)

- we need to measure regulatory effectiveness
- need to prioritise regulatory efforts to maximise effectiveness
- how do you know you're safe?
- occupational h&s measures are of limited use
- numbers of major accidents not statistically useful*

* see <http://www.hse.gov.uk/comah/bpgrange/>

Background (2)

- HSE guidance on “process safety indicators” recommends company-specific measures; but ...
- also need industry-wide measures
 - a “common currency” to help benchmarking

INSPECTION RATINGS

– Risk Control Systems (RCS)



- Safety critical systems
- Permits to work
- Operating procedures
- Maintenance procedures
- Management of change
- Occupational health
- Management of contractors
- On-site emergency response
- Plant commissioning
- Plant & process design
- Auditing
- Competence
- Hazard identification & risk assessment

INSPECTION RATINGS – PART 1: HAZARD INFORMATION SCORES



- Type of explosive
 - (score 2 – 30)
 - Nature of site
 - (score 10 – 30)
 - Potential on-site casualties
 - (score 5 – 15)
 - Site surroundings
 - (score 1 – 5)
 - Type of activity
 - (score 5 – 20)
- Hazard type (HT1 – 4)
 - manufacture or storage
 - Seveso
 - (TT, LT or sub-Seveso)?
 - Low/medium/high?
 - Urban or rural?
 - High or low risk?

INSPECTION RATINGS – PART 2: RISK CONTROL SYSTEMS (RCS) SCORES



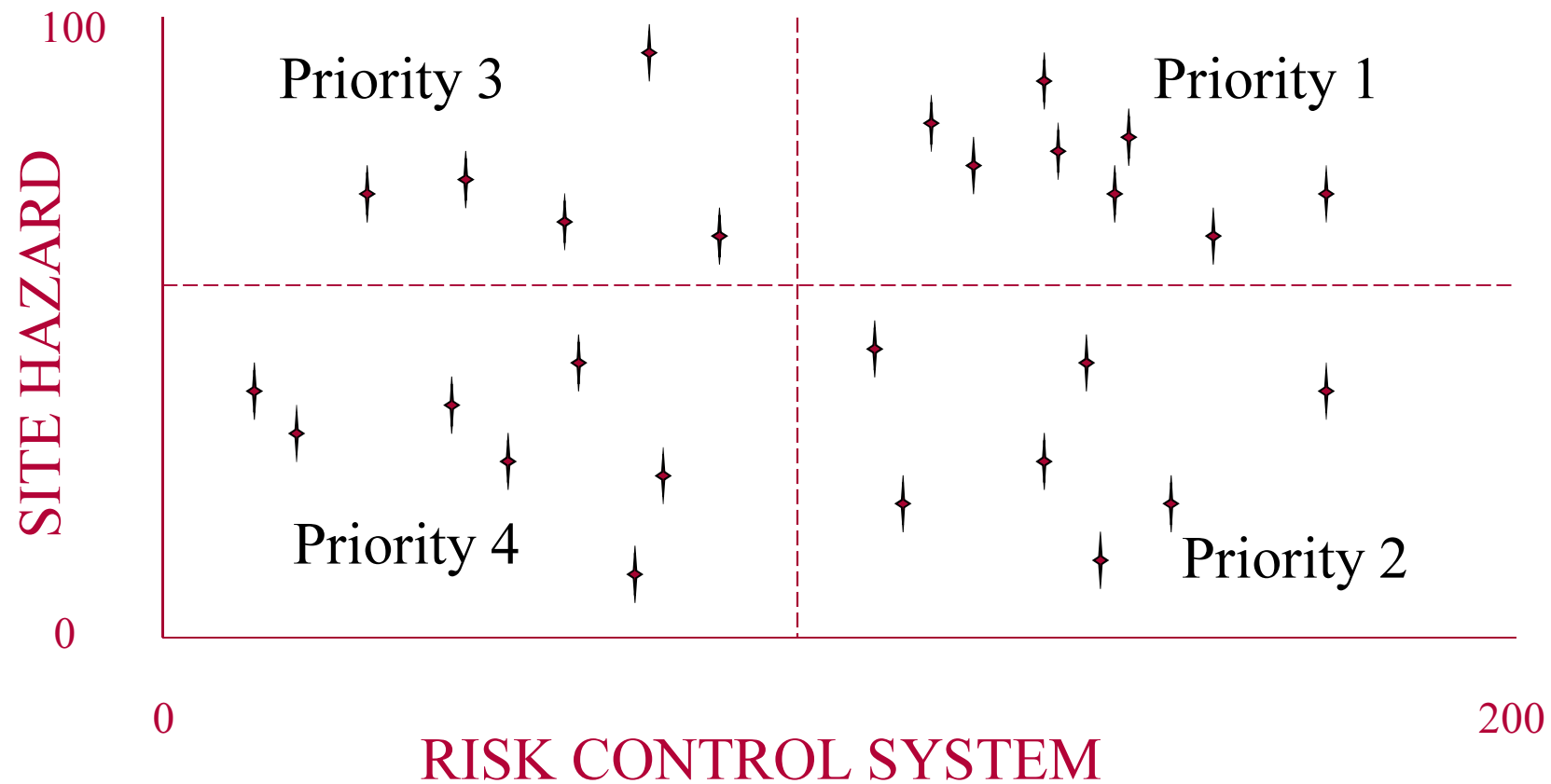
- Relevant RCS are systematic? ➤ Score 10 - 50 (10 = best; 50 = worst)
- Relevant RCS voluntary or driven by regulator? ➤ Score 10 - 50 (10 = best; 50 = worst)
- Relevant RCS are effective? ➤ Score 10 - 50 (10 = best; 50 = worst)
- Degree of general regulatory compliance? ➤ Score 10 - 50 (10 = best; 50 = worst)



INSPECTION RATINGS – site example

FACTOR	DESCRIPTION	SCORE	TOTAL
Type of explosive & activity	Blasting explosives; manufacture	30	91
Nature of site	COMAH (Seveso) top-tier	30	
Potential on-site casualties	3 - 5	10	
Location of site	Rural surroundings	1	
Activity risk	High	20	
Relevant RCS systematic?	Generally effective policy, audit & feedback in place	20	80
Relevant RCS voluntary?	RCS identified in-house	20	
Relevant RCS effective?	Meets minimum requirement	30	
General compliance?	Good	10	

INSPECTION RATINGS – national summary

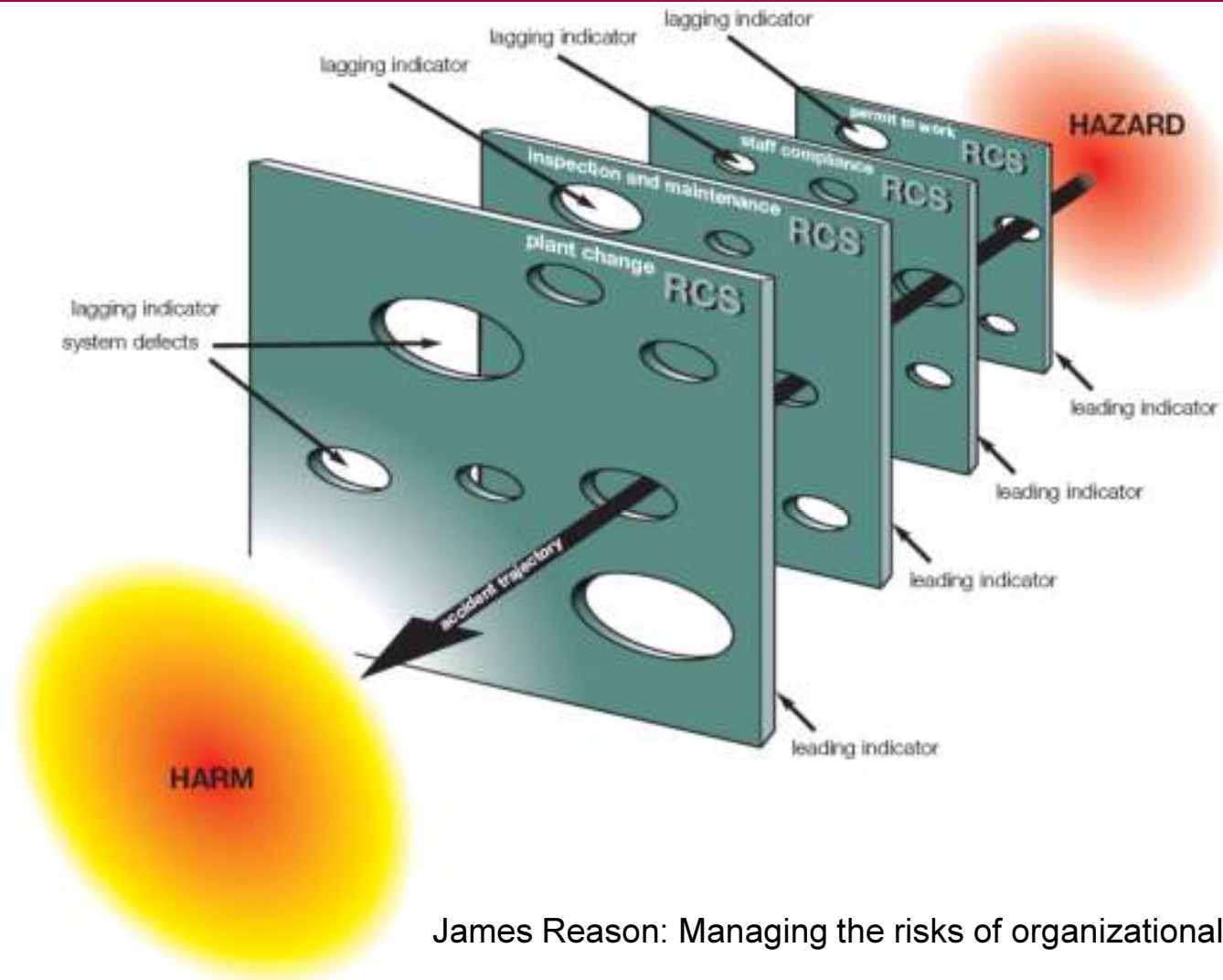


PROCESS SAFETY INDICATORS - monitoring and measuring?

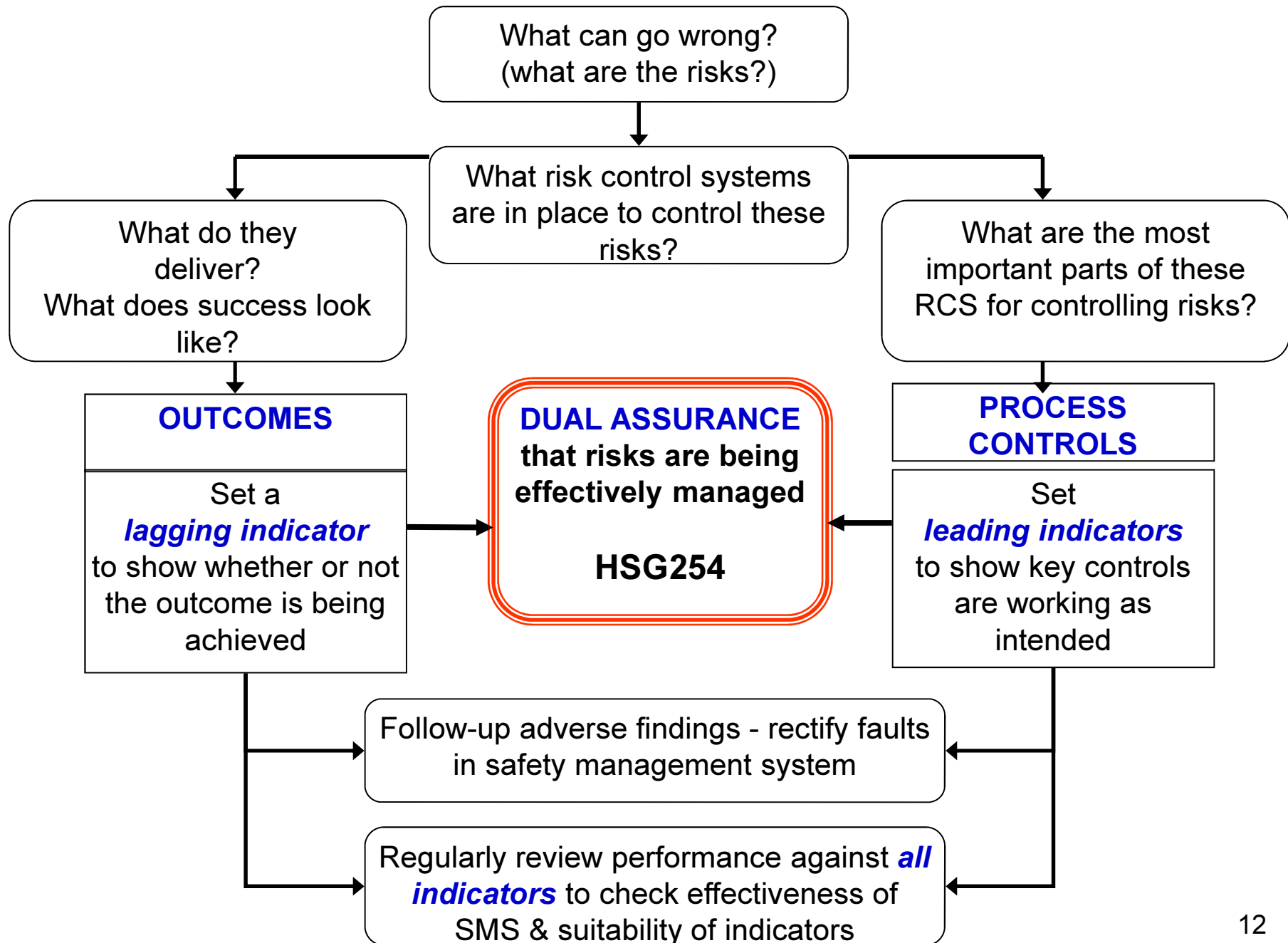


- Workplace inspections often focus on personal safety
- Monitoring near misses tells us nothing about failures yet to occur
- Risk Control Systems can deteriorate over time - and fail catastrophically when needed
- Danger of focussing on system design, rather than delivery of risk control

REASON'S ACCIDENT TRAJECTORY MODEL



James Reason: Managing the risks of organizational accidents; 1997



PILOT PROJECT WITH GB INDUSTRY



-
- Involves 4 multi-site explosives companies in GB
 - Identified major hazard activities & controls
 - for the RCS, assessed:
 - criticality – how close the RCS ‘barrier’ is to the realisation of a hazard and its mitigation
 - vulnerability – the likelihood of the control degrading over time if not monitored
 - Focussed on:
 - how they directly measure control of risk
 - how they use the information to take corrective action
 - What changes as a result – is there a positive impact on safety?

Key areas to monitor/measure

- Operating procedures & violations
- Trained personnel in post
- Review of safety critical control measures
- Safety critical maintenance
- Safety critical inspections
- Incidents where change has been a factor
- Review meetings with contractors
- Incidents attributable to contractors

What Next

- For the volunteer companies:
 - much common ground
 - sharing of experiences & ideas
 - taking SPI's forward on their sites
- For the wider explosives industry:
 - “dual assurance” is good practice in managing major hazards facilities
 - identify key principles for the explosives industry; perhaps a “worked example”
 - simplify the approach for smaller companies