QUEENSLAND MINING INDUSTRY Health & Safety Conference 2017



The Eclectic Regulator

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Department of Planning and Environment



We are all products of our environment

"Analyse your life in terms of its environment. Are the things around you helping you, or holding you back"?

W. Clement Stone



Why have you come to this conference?

To network, catch up with mates, ...improve yourself..... some questions to ask yourself.....???

Do you take risks?

Do you normalise risk?

Do you manage Principal Hazards?

Do you make safety critical decisions?

Do you strive to make a positive difference?

Do you challenge yourself as well as others?

Do you maintain the currency of your qualification?

Do you always `do the right thing, first time and every time'?

Do your actions always support your company's stated H&S goals?

What's the worst that could happen and do you really believe it could?

Sharing

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WHITEHILL COLLIERY

In 1770 the miners at Whitehill coal pit near Edinburgh, broke their bonds. Serfs (slaves) by law, they were the property of the coalmaster, including their women and children. If the coal pit was sold, they were '*part and parcel'* of the price. In return, the coalmaster was obliged to maintain serfs in sickness and old age, even provision of a coffin at their funeral.

Not prepared to wait for their coffins, the miners deserted, but traced to Glasgow, were sent back under armed escort. They were each given a dram of whisky to '*put them in a good humour.*' To their disgust the cost of the whisky was added to their 'bill of expenditure' which they had to repay in weekly instalments.[scottishmining.co.uk]

Eighty six years later the Whitehall colliery was established by Archibald Hood, engineer and entrepreneur, who developed the colliery and miners village from 1856. Hood sank a new shaft in 1878, built railways for the mines and erected good quality houses for the miners. In 1890 he amalgamated his company with the mining interests of the Marquess of Lothian to form the Lothian Coal Company.

This is where granddad Patrick Murphy and uncle Michael worked and died underground "brought up the street on a hand cart". [Mary Murphy - my granny]

ABERFAN OCTOBER 1966

144 DEAD (116 CHILDREN)



SEPTEMBER 1972

STARTED AS MINING CRAFT APPRENTICE WITH NATIONAL COAL BOARD (NCB)





UK PIT DISASTERS - 1972 - 75





COAL FACE TO MINING REGULATOR

- ► Mining craft apprentice
- Power-loading coal face worker
- ► Face production Chargehand
- ► Shotfirer & Pit Deputy
- ► Mines Rescue Captain
- ► Shaft sinking shotfirer
- Technical Assistant / NCB Engineering Training Scheme
- ► Undermanager
- ► Deputy manager
- ► Mine manager
- ► Deputy head NCB industrial relations
- ► HM Inspector of Mines
- ► HM Principal Inspector of Mines
- ► Chief Inspector of Mines

TRAINING FOR POWDERHALL PROFESSIONAL SPRINT

2ND 1978 / WINNER 1979







THAT'S MY BOY! Proud father Jim Forster beams with delight as he and his son, Skol Sprint winner Tony, share a moment of Cup joy.

 PDS-ON forvarhed only one mon to thenk for his brillions

 Miles Tony Forster back only one mon to thenk for his brillions

 That man is his dat metres away and didn't metres awa





Bentley

Yorkshire

1978

Runaway and derailment of manriding train

7 fatalities

Golborne Lancashire

1979

Explosion degassing heading caused by exposed electrical connectors

10 fatalities





1984 - KILLOCH COLLIERY AYRSHIRE

- A moment of calm in the eye of a storm - The 'Miner's Strike'
- 5th March 1984–3rd March 1985 - industrial action by miners in an attempt to prevent colliery closures.
- Led by Arthur Scargill of the National Union of Mineworkers (NUM) against the National Coal Board (NCB)
- "A battle of ideas that split a nation" [BBC Wales]



PIT CLOSURES

- March 1985 Number of UK Miners returned to work after year long strike 186,000
- December 1995 Number of UK Miners in coal industry at time of Privatisation 25,000
- December 2016 Number of UK deep coal mines - nil







CHALLENGER DISASTER 1986

- Crew compartment eventually recovered from the Ocean floor after length search and recovery operation.
- Several crew members found to have survived the explosion but not the impact
- No escape system on the crew capsule
- Rogers Commission found NASA did not follow its own safety rules
- NASA disregarded repeated warnings about the 'O' rings and referred to the issue as "an acceptable flight risk"
- Commission made the comment:
 "reality must take precedence over rhetoric for reality cannot be fooled"

CHALLENGER DISASTER 1986

- Dr Diane Vaughan ('The Challenger Launch Decision') carried out an examination of key decisions taken by NASA and what contributed to the doomed flight of the Challenger space shuttle.
- NASA aware that below a certain critical temperature brittle 'O' ring failure on the solid booster rockets was likely, but permitted the flight to continue resulting in a catastrophe and death of 7 crew members.



Normalising Risk

- Denial of lead indicators
- ► Usually a process, not an event
- ► Risk taking incentivised and admired
- ► No concept of the brutal reality of failure
- Incomplete knowledge and / or inexperience
- Repeated risk-taking does not result in catastrophe



Normalising Risk (cont)

- ► Risks are rewarded
- Risky decisions justified
- Abnormal becomes the normal
- Detractors are sidelined or silenced
- Peer support bolsters ever greater risk-taking
- Regulators stand accused as some of the worst culprits





COLUMBIA DISASTER 2003

- After 'Challenger' NASA created a new regulator called 'Office of Safety, Reliability and Quality Assessment".
- Regulator proved to be ineffective, suspected of being too close to 'customer'; not 'truly independent' and accused of a 'failure to learn'.
- ➤ In 2003, Space Shuttle Columbia disintegrated on re-entry killing all seven crew when a piece of foam broke loose from a fuel booster rocket on lift-off, damaging leading edge of Shuttle wing.
- Engineers aware that the wing was fragile, one later stated "it wasn't even as strong as the fibre glass wing on a Corvette". Concerns were ignored.
- Investigators reported it may have been possible for the Columbia crew to repair the damage, or for the crew to be rescued from the shuttle under several scenarios. No rescue or repair attempt made.
- NASA was found to have normalised the dangers of space flight; a flaw in the agency's safety culture led to the Columbia tragedy, according to investigators.



Piper Alpha - Scotland 1988

- Lord Cullen, appointed to conduct a government enquiry into the disaster in which 168 oil rig workers died.
- Safety management systems were based on "informal and unsafe practice" and were "knowingly and flagrantly flouted". Once ablaze, failings in the emergency procedures and equipment meant workers on the platform stood no chance of escape.
- Widespread and serious safety failures, not only in Piper Alpha's operation safety systems but in the UK Department of Energy's (DoE) regulation of the industry.



UK Department of Energy inspectorate (circa 1988)

Of the regulator, Lord Cullen pulled no punches.

"The inspections were superficial to the point of being of little use as a test of safety. They did not reveal a number of clear cut and readily ascertainable deficiencies ... [and] ...led me to question, in a fundamental sense, whether the type of inspection practised by the DoE could be an effective means of assessing or monitoring the management of safety by operators."







HM MINES & QUARRIES INSPECTORATE

In 1840 a Royal Commission was established to investigate working conditions in coal mining. By 1842 the Commission had reported serious failings by owners along lines similar to those found in the textile mills.

Their report prompted Parliament to pass the <u>Coal Mines Act 1842</u>, which prohibited women and children from working underground. The Act also provided for the appointment of an Inspector of Mines and the first, Hugh Seymour Tremenheere, commenced his duties in 1843.



HER MAJESTY'S MINES INSPECTOR 1988-2013

Early 1990's - Small mines multi agency emergency training exercise

STILLINGFLEET MINE- SELBY COMPLEX 1992

- ➤7 April 1992, 10 men (not 8 as reported in press) trapped when a `mixed' support development gate road collapsed. Approximately 10m length of roadway crushed
- ▶Primary support by steel RSJ arch with supplementary 2.4m 22mm dia. resin bonded roof bolts. No roof bolt `tell-tale' monitoring because bolts `not the primary support'
- ► Methane levels increasing and oxygen levels dropping due to loss of auxiliary ducting
- ► Rescue teams comprised colliery staff, mines rescue and HM Mines Inspectors
- ► Air supply achieved using existing 100mm dia. air and water pipe lines
- ► Increase in temperature for those trapped and especially rescue teams
- ► Tunnelled through debris using bare hands, shovels and timber support
- ► Several cases of heat exhaustion with rescuers
- ► Rescue achieved within 24 hours
- ►All miners rescued unharmed







BILSTHORPE COLLIERY DISASTER 1993

- ► On 18th August 1993, thee men were killed by a 57m long fall of roof in the 45's supply gate of the Parkside seam at Bilsthorpe Colliery Nottinghamshire.
- ► Three other men were also trapped but rescued some time later following a sustained and heroic effort by Mines Rescue and Mines Inspectorate staff.
- ► Recovery of last victim took 4 days
- PIT inspectors came under fire yesterday for allowing the victims of the Bilsthorpe colliery disaster to work in allegedly dangerous conditions" [Independent 25 Aug. 1993]
- Inquiry into failure of roof bolted support initially cast doubt on decisions taken by Mines Inspectorate to grant an exemption for support of skin-to-skin development roadways by rock bolts
- In the end the 'roof bolts' were not found to have been the cause but mobilisation of the adjacent goaf was considered a prime factor in the disaster





















GLEISION DISASTER 2011

- SM litres of water released over 26 seconds into 1m high hand-won 'pillar and stall'
- 7 underground at time of inrush, 3 survivors, 4 fatalities
- Multi-agency rescue and recovery took 2 days. Mine recovery achieved in 28 days
- ► Police / HSE investigation











UPPER BIG BRANCH - 5 April 2010

- > 29 miners killed when defective shearer picks ignited gas on a coalface as the shearer entered the tail gate corner. A fire and coal dust explosion then engulfed the mine.
- A panel assembled by the National Institute of Occupational Safety (NIOSH) concluded:

"if the regulator had engaged in timely enforcement of the Mine Act, it would have lessened the chances and possibly prevented the explosion."







PIKE RIVER - 19 November 2010

- The Royal Commission into the Pike River disaster, asked whether a 'well-led, operationally competent' regulator would have acted decisively in the face of evidence of a situation concerning inadequate ventilation and excess methane gas levels?'
- The Commission considered that it is "probable" that an "effective regulator" would have taken decisive action.
- ► The Commissions's opinion of Department of Labour Inspectorate was that it was *"ineffective, operationally limited and poorly led".*





Department of Labour







PIKE RIVER ROYAL COMMISSION OF INQUIRY

- Had to conduct an investigation without having the benefit of access to the mine.
- ► The immediate cause of the tragedy was a methane explosion.
- Concluded that a collapse of the goaf which expelled methane
 into connecting roadways was the most likely fuel source.
- As methane plug was carried by the ventilation system, it diluted and came into contact with an ignition source.
- Potential ignition sources included electrical arcing, diesel engine overheating, contraband, electric motors in the nonrestricted part of the mine and frictional sparking caused by work activities.



NZ DEFENCE FORCE AT PIKE RIVER

- October 2013 work commenced on clearance of explosion debris from the shaft top
- December 2013 vent shaft sealed
- ► October 2014 recovery abandoned



Dinion

THE DOMINION POST

Our work-safety culture is fatally flawed

IKE RIVER showed it; the unacceptable rate of death and injury in the nation's forests firms it. Light-handed regulation s not provide adequate protection for ple who work in dangerous ustries.

Twenty-nine people were killed by methane gas explosion in the Pike er mine in 2010. The cause of the losion has still to be established but, s aftermath, it has been revealed mine management, staff and ractors at what was supposed to be te-of-the-art operation were all ring basic security precautions in uit of increased production. To make matters worse, the then-Labour Department which was charged with ensuring safety guidelines were adhered to had only two inspectors to oversee about 1000 mines, quarries and tunnels nationwide.

The story in the nation's commercial forests is depressingly similar. In the past five years, 30 forestry workers have been killed on the job. Hundreds more have been seriously injured.

The causes of the deaths and injuries vary, but common to many has been limited training, pressure to meet deadlines, unsafe work practices and inadequate supervision.

In response to the latest deaths last

week, one of New Zealand's largest forest owners, Hancock Forest Management, urged contractors to take a leaf out of the All Blacks' book and take a "day by day" approach to ensuring worker safety just as the All Blacks took a "game by game" approach to achieving the perfect season.

It was a wholly inadequate response to the deaths of two men, neither of whom, it should be noted, were working in the company's forests.

It is not a change in attitudes that is required but a change in practices. The sorry tale of death and injury will continue till forest owners and contractors invest more in training. supervision and equipment and pay slightly less heed to the bottom line.

New Zealand is a First World country. It should not tolerate Third World work conditions. But that is the point it has arrived at thanks to the fragmentation of the industry and the abdication by successive governments of their responsibility for ensuring worker safety.

Responsibilities once assumed by companies that not only owned the forests but also harvested them and sold the finished product now fall between forest owners, contractors and workers.

The scale of the problem is illustrated by Ministry of Business, Innovation and

Employment investigations. In recent months it has inspected

WORD OF THE DAY

SING - waiata (why-utter)

In recent months it has inspected almost half the country's 330 logging contractors. The results are staggering. One-hundred-and fifty site visits have resulted in 182 non-compliance notices being issued. Operations at 14 sites were so dangerous the inspectors immediately halted production.

Plainly the industry cannot be relied on to keep its workers safe. The Government must assume the

Government must assume the responsibility with a rigorous, ongoing inspection regime.

Too bad if it slows production. Forest owners and operators have had their chance. They blew it.











Articles of War 1629

The Provost must have a horse allowed him and some soldiers to attend him, and all the rest commanded to obey him and assist him or the service will suffer : for he is but one person and must correct many; and therefore cannot be beloved. And he must be riding from one garrison to another, to see that the soldiers do not outrage nor scathe about the country.







NZ MINING SECTOR

- ► Day 1 'nothing' and Pike River
- ► Day 2 'targeted methane assessment' and Pike River
- Establish a respected regulator give inspector basis critical risk assessment tools.
- ► Reduce single inspector inspections; Small teams
- ► Draft, consult, socialise new Mining Regulations
- Draft, consult, socialise and Approved Codes of Practice to support PHMP and PCP
- ► Create a 'share-point' IT base
- Draft, consult (with agency stakeholders) <u>test</u> and enact new Multi-Agency emergency response code; 'The Underground Mines Emergency Protocol'
- ► Establish and Chair NZ Board of Examiners
- Create the Extractives Industry Advisory Group (to oversee the activities of the mining regulator)
- Establish statutory CPD. Bring all administration functions 'in-house'
- Establish and Gazette new industry qualifications for statutory ticket holders
- ► Challenge inadequate industry training standards
- ► Create National Training Forum
- ► Create NZ National Mine Plan Repository



NZ QUARRIES SECTOR

- Lack of specific regulations
- Lack of industry guidance
- No idea of how many quarries or where they were (500 - 1500)?
- Overwhelming desire to improve
- Engagement and consultation with Industry
- Extremely tough discussions
- Support for the Regulator from industry peak bodies
- Support for the Regulator from individual top extractives companies
- Personal effort and commitment by HHU Extractives Inspectors and Staff



NZ CIVIL TUNNEL SECTOR

- Tunnel Industry included in NZ 'Mines & Quarries' regulation
- 'Waterview' 2.4km long road tunnel - single entry drive / two way with cross-cuts installed once both legs driven
 - 15m diameter TBM Earth Balance Machine - Hyperbaric systems
- Largest diameter civil engineering tunnel under construction
- 'Probably' safest tunnel ever constructed
- Multiagency emergency response capability tested













NZ RAIL AND ROAD TUNNELS

- Long single-leg locomotive tunnels
- ► Long single-leg road tunnels
- ► Geographic remote locations
- Extreme weather situations
- Emergency response plans
- ► Fire engineering
- Inter-authority working
- ► Inter-agency collaboration



NSW MINES SAFETY REGULATOR

- ► Respect
- ► Effectiveness
- ► Consistency
- ► Transparency
- 'Add Value' (as a regulator)





Challenge and Change Aims

- ► Critical Risk Control focussing on Principal Mining Hazards
- ► Intelligence Lead Decisions (data recovery and analysis)
- ► Human Factors (human and organisational behaviour)



Challenge and Change Priority

- ► Introduction of Targeted Assessment to examine Critical Risk Controls
 - ► TAPs / TIPs
- ► Hazard Appraisal (initial assessment of hazard load) e.g. a 'gassy mine'
 - ► Risk Ranking
 - ► Principal Safety Hazards
 - ► Principal Health Hazards
 - ► Respirable Dust
 - ► Diesel Fume
 - ► Fatigue
 - ► Heat

Sharing

storv

Challenge and Change Strategy

- increasing checks and balances
- > diffusing decision powers
- > diversity of thought
- information lead
- ➤ fit for purpose
- ➤ accountability
- ➤ transparency
- consistency

Sharing

story

Challenge and Change Strategy

> Structural reform

Sharing

y story

- `Office of the Chief Inspector' (triumvirate)
- Reduce `one Inspector / one mine' approach
- Centralised Assessment Unit (CAU)
- Proactive and Reactive arms
- Intelligence and Analysis
- Interdisciplinary teams
- Centralised reporting
- ► Information sharing
- Monthly activity reports
- Continuing Professional Development
- `Zero Tolerance' for repeated methane exceedance
- Elevated intervention for emerging principal hazard control failures



INFLUENCING HUMAN BEHAVIOUR - FACTORS (JOP GROENEWEG "CONTROLLING THE UNCONTROLLABLE")



- I. Don't try to change behaviour, try to make the system 'fool-proof' [Cost = high / Effect = low / Outcome = poor]
- 2. Increase motivation and awareness
 [Cost = medium / Effect = low / Outcome = medium
- S. Tell them 'what to do' i.e prescription [Cost = low / Effect = low / Outcome = medium]
- A. Reward and punish [Cost = medium / Effect = medium / Outcome = medium
- 5. Select smarter personnel [Cost = high / Effect = medium / Assessment = medium
- 6. Change the environment [Cost = high / Effect = high / Outcome = good

LEADERSHIP STYLES



- There does not appear to be a singular ideal leadership style
- Neither is there only one way to manage an organisation under every set of circumstances
- Leaders' skills (subconsciously) moulded by unique experiences
- Leaders are constantly evolving as individuals: to remain relevant, must be alert to change
- Good leaders sense critical events and are dynamically capable of responding appropriately
- ► Effective leaders are authentic



THE ROLE OF A REGULATOR?

Regulators should educate, encourage and enable best practice as well as enforce legislated standards

Regulators <u>must</u> intervene when organisations behave in a manner inconsistent with safety even if it is inconvenient or unpopular

Regulators need good assessment and work-flow processes to accurately and reliably deal with compliance failures, the correct mix of professional skills to identify safety critical issues and above all else, the courage to take effective and decisive action

"A catastrophic failure of imagination"

Pike River Mine

Atarau, Greymouth, New Zealand

















Peter (Pete) Rodger

loshua (Josh) Ufer



David (Dave) Hoggart

Blair Sims



Pike River Coal









Subtech Services





Michael Monk

VLI Drilling









Peter O'Neill

Joseph Dunbar



Brendon Palmer



Benjamin (Ben) Rockhouse



CYB Construction















Boyd Kilkelly Builder



Graeme Pizzato Contracting





In Memory of the victims of Grenville Tower London "First the pain, now the outrage"