



Industry &
Investment

MINE SAFETY

INVESTIGATION UNIT

Fatal Injuries from a Recoiling Polyethylene Pipeline
At a Horizontal Directional Drilling Installation on a
Petroleum Assessment Lease in Northern NSW

1 August 2009

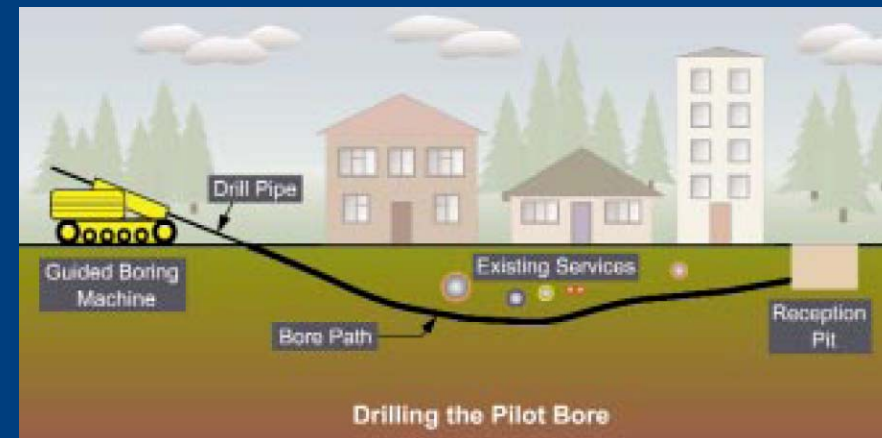
Horizontal Directional Drilling Fatality

- Incident - 1 August 2009
- Involved contractors and sub contractors
- At a Coal Seam Gas exploration site in NE NSW
- Excavator was pulling pipe using lifting chains
- Chains failed and pipe recoiled striking bystander



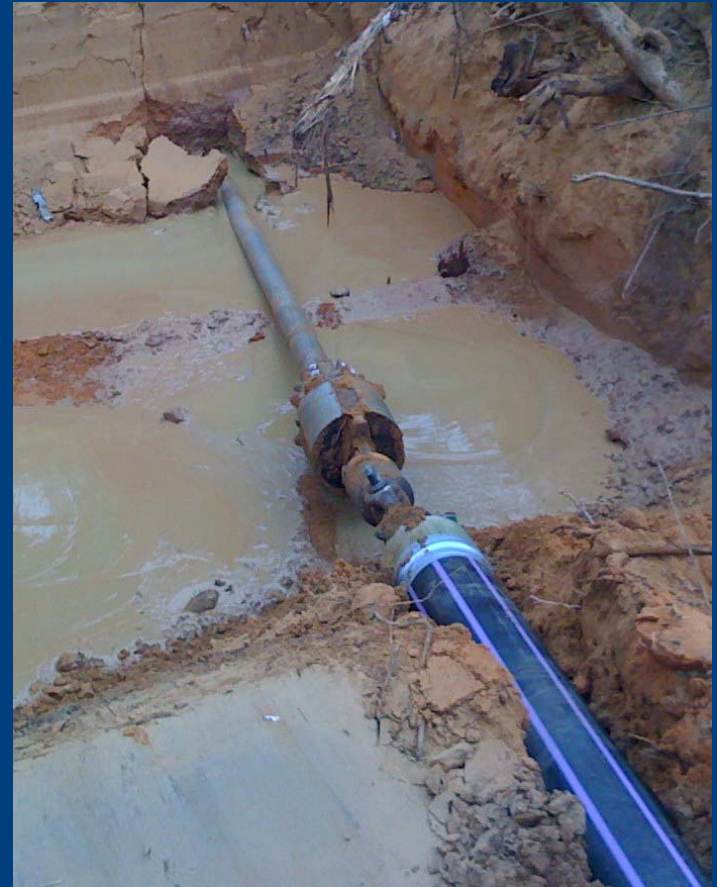
Horizontal Directional Drilling Method

- Trenchless installation of services in all types of ground
- Able to go under existing services and bodies of water
- Pilot hole is steered by controlling line and depth
- Pipeline pulled in behind reaming head on a swivel



Prior to the incident

- The pilot hole was successfully drilled about 360m under a creek in a State Forest bush location
- Back reaming had progressed about 230m
- The 200mm pipe was being pulled in behind the reamer
- The coupling failed leaving the reamer and pipeline in the ground under the creek
- Initial digging in the creek did not find the pipe



Prior to the incident

- The pipe and reamer were located using a transmitting beacon inserted to the end of the pipe
- Digging in the creek located the pipe
- Due to water and running sand the reamer could not be recovered
- Attempts were made to sever the pipeline using the bucket on the excavator



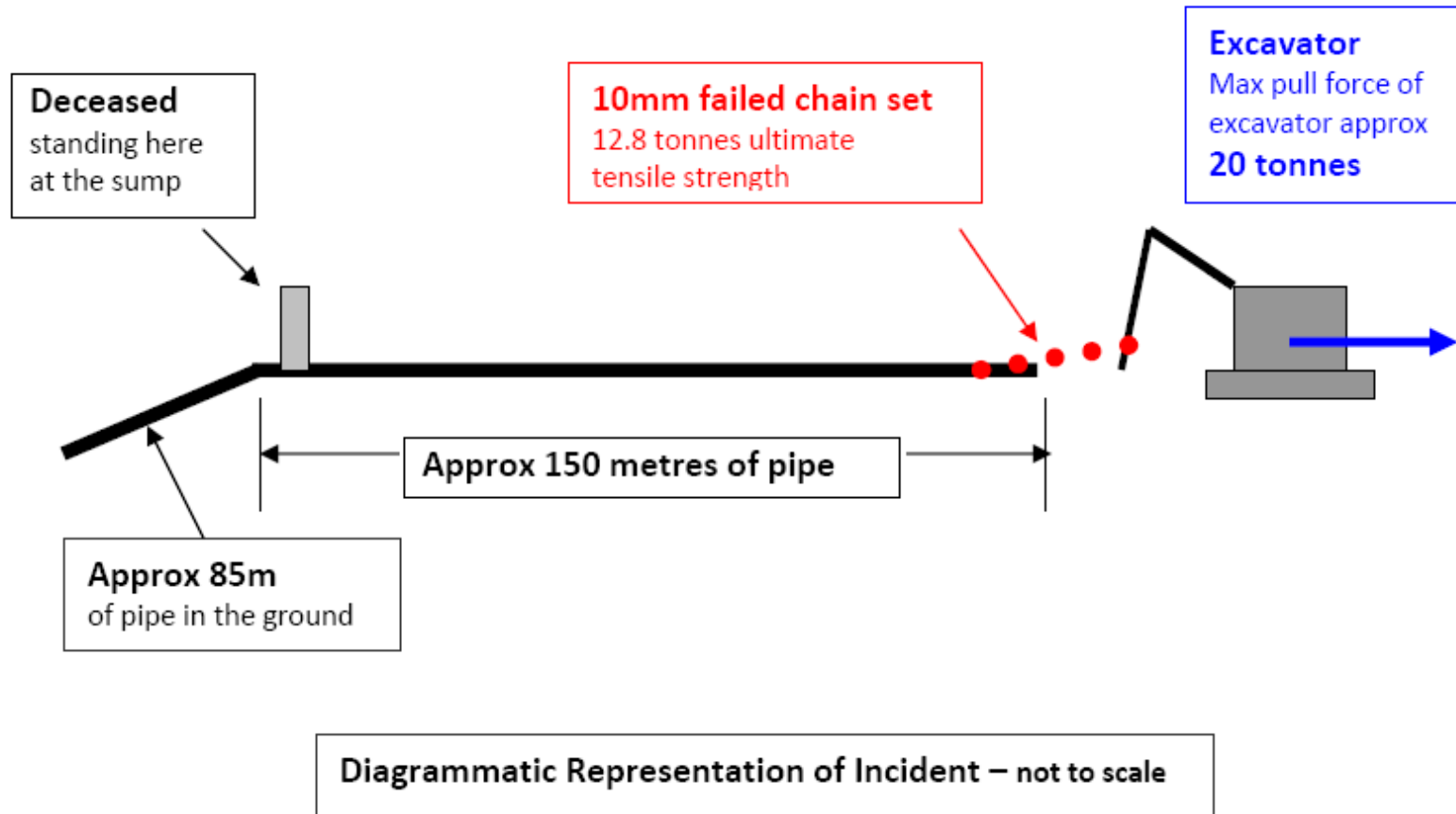
The incident

- Approximately 145m of pipe had been extracted
- The chains connecting the pipe to the excavator failed
- The pipe recoiled rising up at the pit end
- The bystander was close to the pipe and received a blow to the head



- The victim was found lying at the front of the pit

Prior to the incident



The injuries and treatment

- Road and air ambulances responded quickly
- Treatment was provided at Tamworth and John Hunter hospitals
- Injuries included
 - cerebral haemorrhage
 - Haemorrhage around the upper spinal cord
 - Broken jaw
 - Laceration and bruising
- The injuries led to loss of neurological function and subsequent death.

Findings

- The hazard was recognised and control was attempted using administrative means
- Risk assessment was ad hoc and incomplete
- The OHS system of the contractor was not properly applied
- The OHS system of the principal did not control the risk
- No physical barriers were used and the 'no-go' area was poorly defined
- There is a need for guidance material on how to establish safe systems of work for towing or pulling

Findings (continued)

Deficient work practices were:

- No Safe working zone established or enforced
- Use of an excavator for a purpose other than which it was designed ie towing or pulling.
- Use of an excavator to apply unknown forces well in excess of the WLL of the chains.
- Use of chain set for purpose other than designed
- Exceeding the rated load on the lifting chains
- Place a knot in the lifting chains
- Connect the chains to a bucket tooth on the excavator
- Incorrect attachment to the pipeline

Best practice

- Develop safe pulling systems that apply known forces
- Develop pulling systems that minimise stored energy
- Apply safe working zones (exclusion zones) and monitor them
- Consider using towing components that rupture non-violently.
- Use towing systems that are properly designed by competent (engineering) persons

Best practice (continued)

- Apply the hierarchy of controls of the OHS Regulation
- Ensure there is a properly applied OHS system in place
- Ensure persons are trained and qualified
- Ensure contractor management is properly applied
- Include reporting of unexpected events/problems
- Review and audit the system and ensure it is maintained

Related published resources

Safety Alerts/Bulletins

- SA09-10-Directional-boring-fatality
- SB09-03-Broken-pull-chain-results-in-fatality
- SB07-10 Hazardous energy control
- SA05-01 Changed work practices employer obligations
- SA04-09 Broken chain connector results in serious injuries
- SA04-05 Crane dogger killed while unloading trailer – updated
- SA03-10 Crane dogman killed unloading trailer
- SA00-01 Serious injury involving stored energy

www.dpi.nsw.gov.au/minerals/safety/safety-alerts



Related published resources

Mine Design Guidelines

- MDG 40 Guideline for Hazardous Energy Control, Isolation or treatment
- MDG-1010 Risk Management Handbook for the Mining Industry
- MDG 5003 Guidelines for contractor OHS management for NSW mines
- MDG 5004 A study of the risky positioning behaviour of operators of remote control mining equipment

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