Mine Health and Safety Council

Technology transfer on minimising seismic risk in the platinum mines

20 September 2017, SAMIRA '17

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MHSC

Presentation Outline

1. MHSC Mandate
2. Percentage Fatalities by Classification
3. Fatality Frequency Rate
4. Fall of Ground vs Transportation and Mining Fatalities
5. Frequency of Disaster Accident
6. Project Aim
7. How Were Research Outcomes Achieved
8. Way Forward
9. Implementation of Research Outcomes
10. Research Conclusions
11. MHSC New Structure
12. Questions

1. MHSC Mandate

MHSC is a national public entity established in terms of the MHSA, No 29 of 1996, Celebrating 20 years in May 2017.

- **Advise the Minister on all occupational health and safety issues in the mining industry relating to legislation, research and promotion**
- **Review and develop legislation (regulations) for recommendation to the Minister**
- **Promote health and safety culture in the mining industry**
- **Oversee research in relation to health and safety in the mining industry**

1. MHSC Mandate

Technology, Innovation & product development and commercialisation	Research outcomes inform alternative use of existing technology or introduce new mining techniques, technology and personal protective equipment to mitigate or eliminate exposure to occupational health and safety risks and improve outcomes	Research outcomes may be required to inform a review, update or amendment of existing occupational health and safety legislation, to drive the achievement of desired practices and outcomes within mining operations.	*Legislation, regulation and standards*
Training	Research outcomes can be used to inform the design of occupational health and safety training interventions. Training interventions should also be developed to support the launch and promotion of new technology, innovation and products emerging from research activity.	Research outcomes to be publicised and promoted and industry-wide (nationally, regionally and internationally) through journal publication, and through marketing and promotion efforts.	*Promotion*

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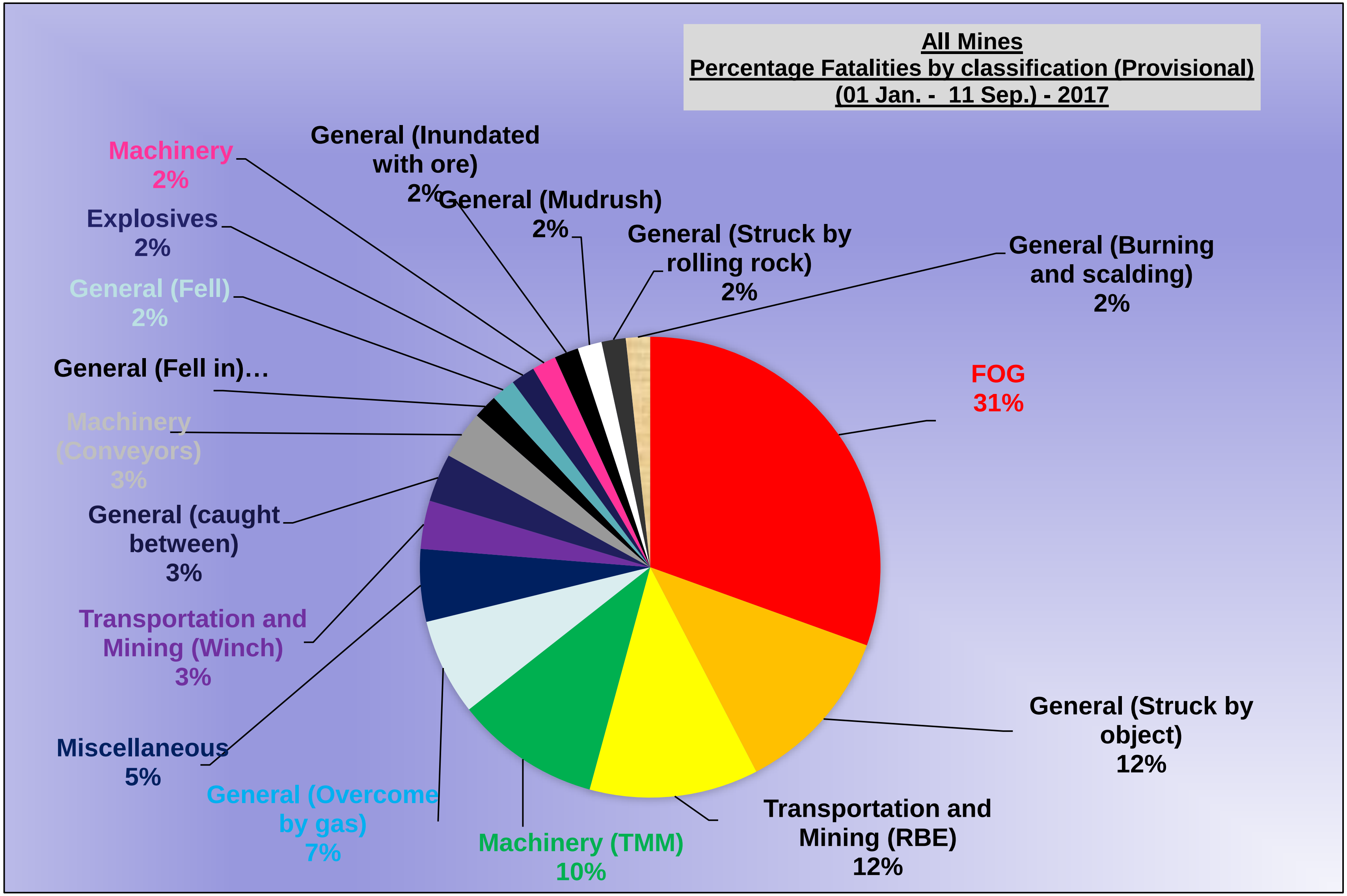
2. Percentage Fatalities by Classification



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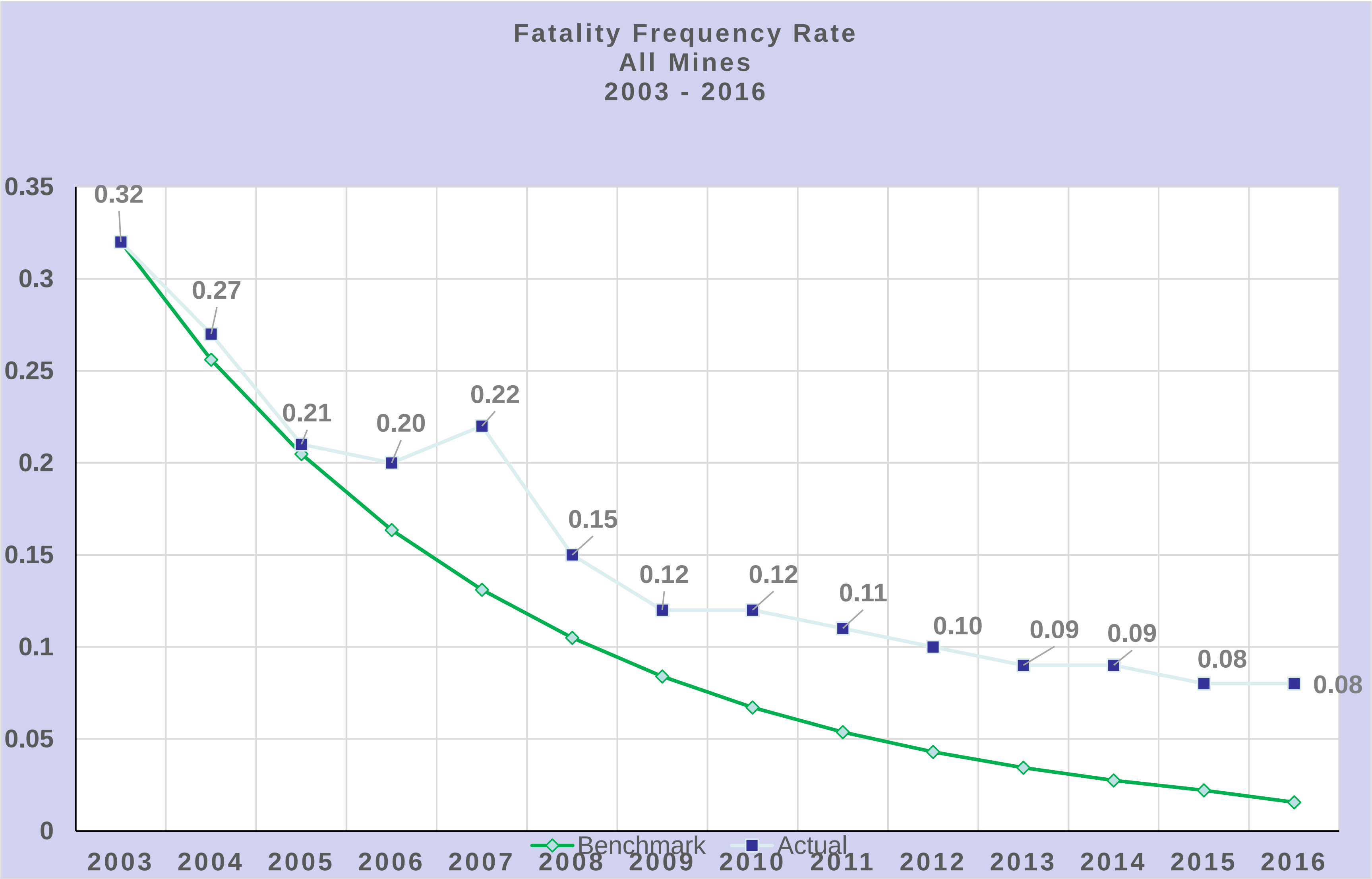
3. Fatality Frequency Rate



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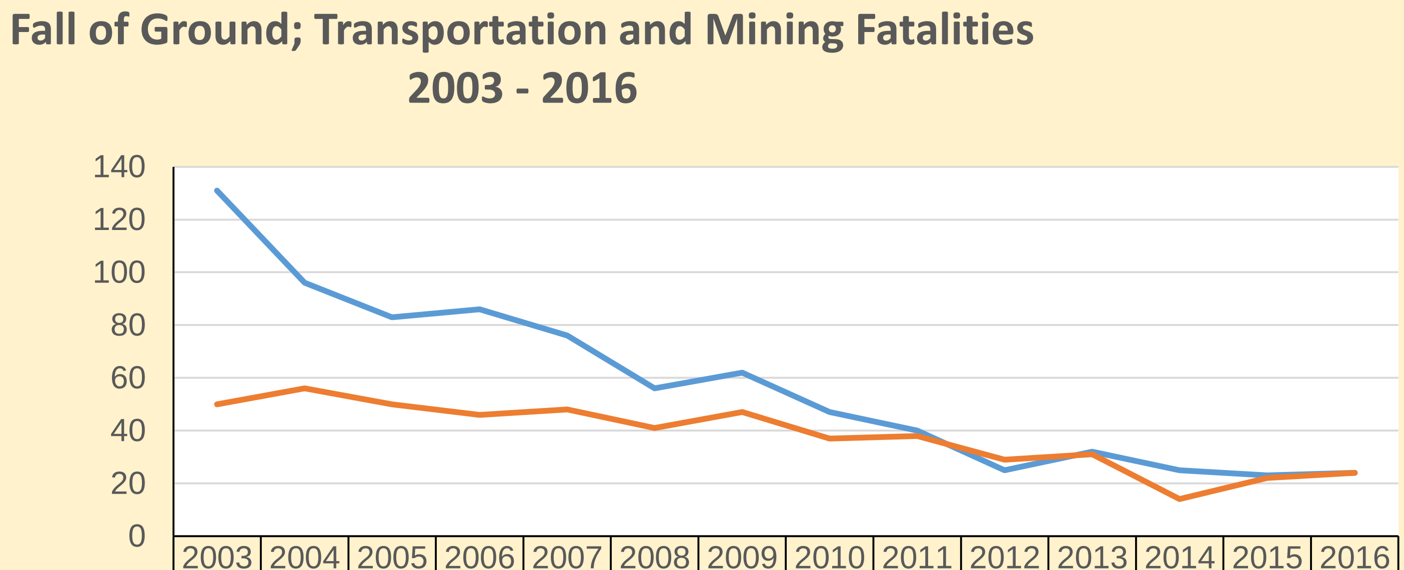
4. Fall of Ground vs Transportation and Mining Fatalities



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fall of ground	131	96	83	86	76	56	62	47	40	25	32	25	23	24
Transportation and Mining	50	56	50	46	48	41	47	37	38	29	31	14	22	24

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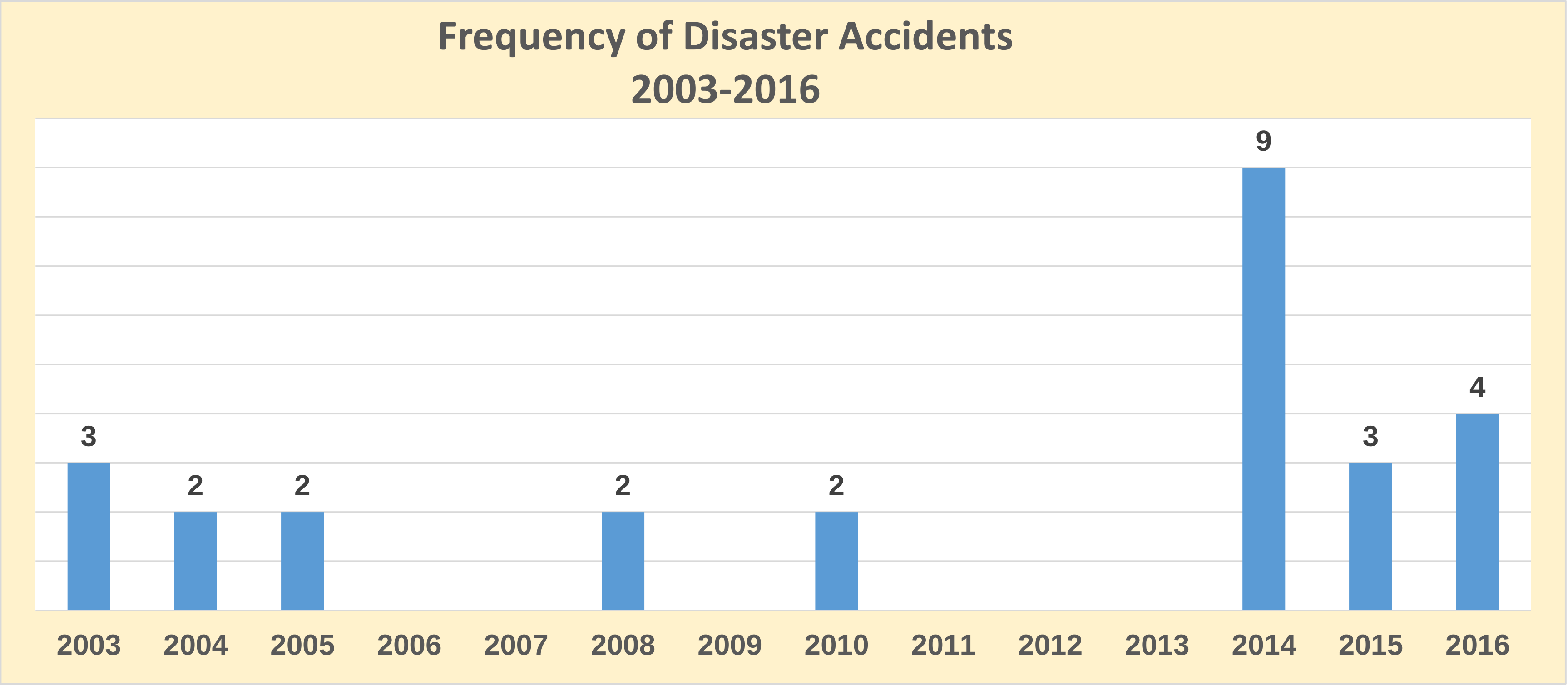
5. Frequency of Disaster Accidents



6. Project aims

MILESTONE
Project initiation (start-up presentation and report)
1. Learning materials for production personnel
2. Production personnel training roll-out
3. Learning materials for Rock Eng. personnel
4. Seismic system audit protocol
5. System audits
6. Audit results
Final report (approval)

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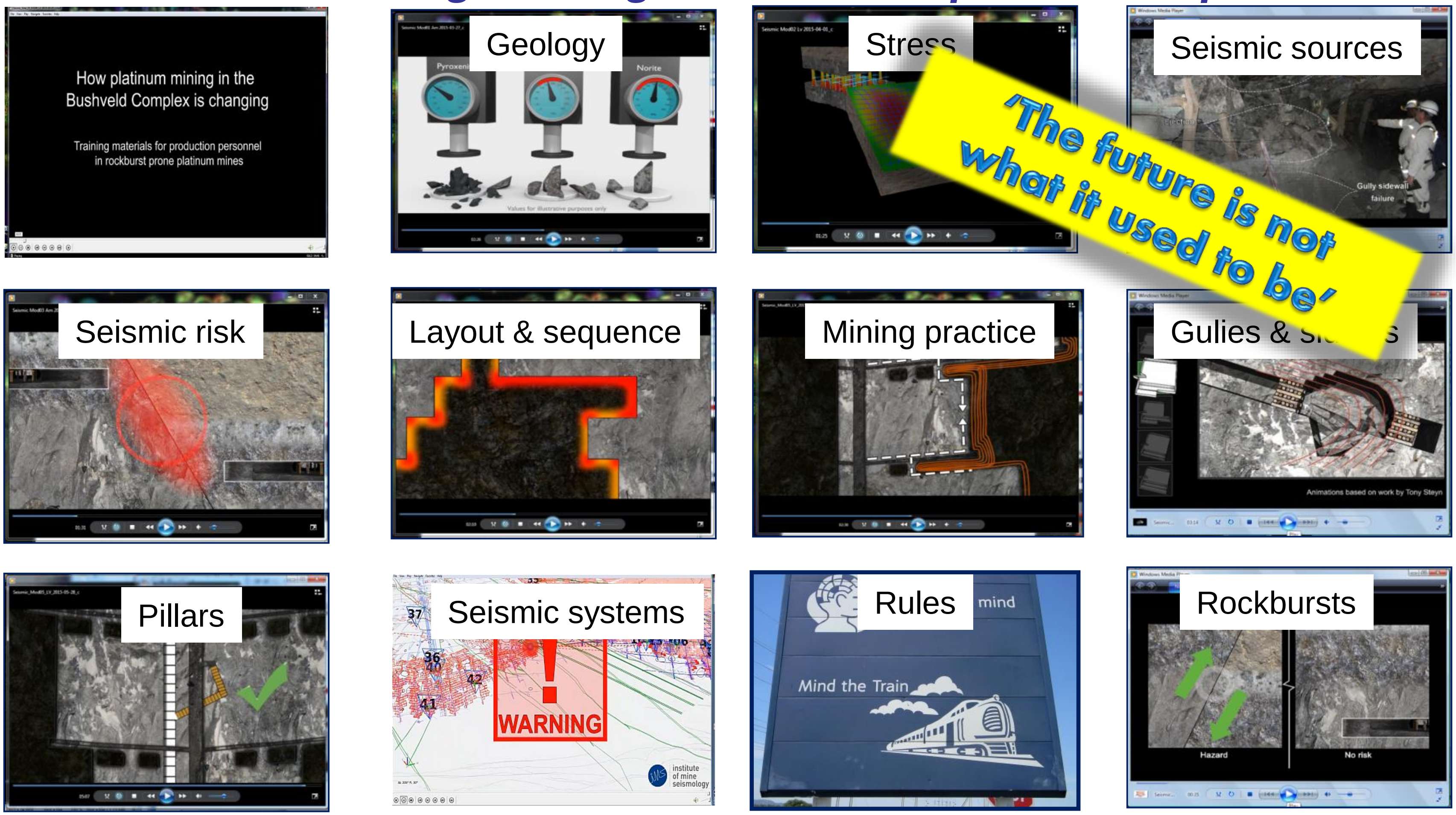
- **Research outcome 1:**
  - ***Animated learning training materials for production personnel***



7. How were the research outcomes achieved?

- **Research outcome 2:**
  - ***Roll-out of the production personnel training incl. train-the-trainer workshops on all mines with seismic hazard.***

Implats Visitor Centre 6/11/2015

Bokoni Manager's Boardroom 24/11/2015

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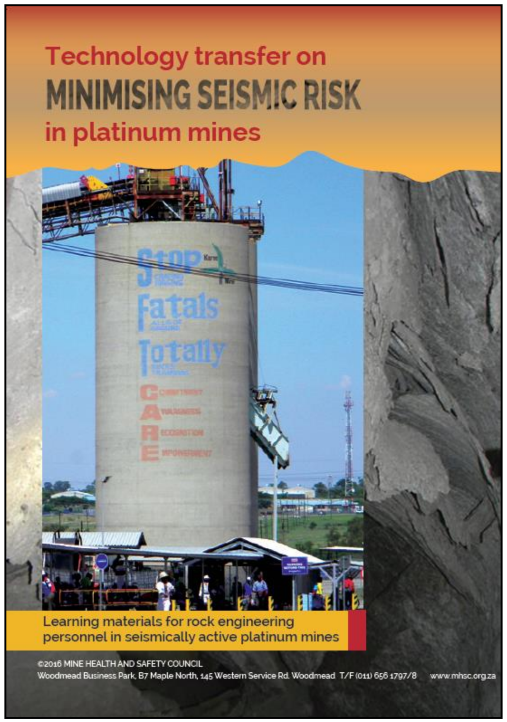
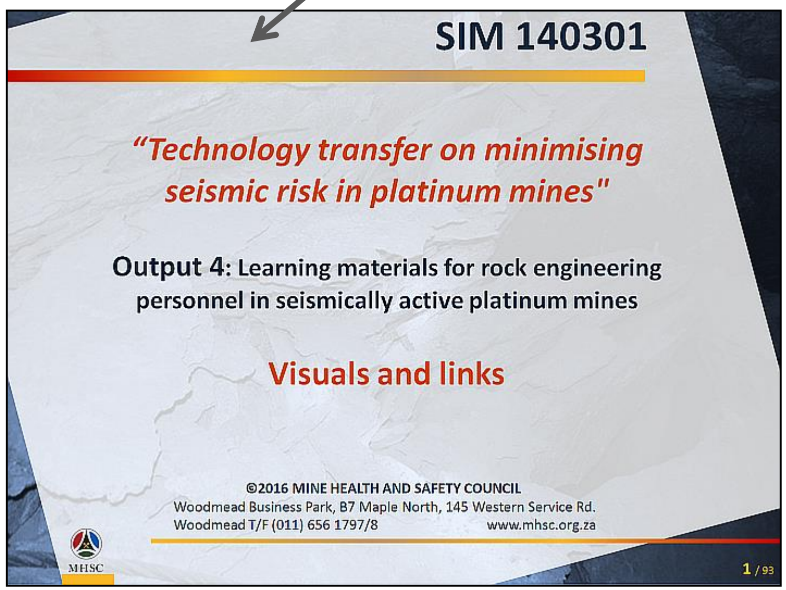
8. How were the research outcomes achieved?

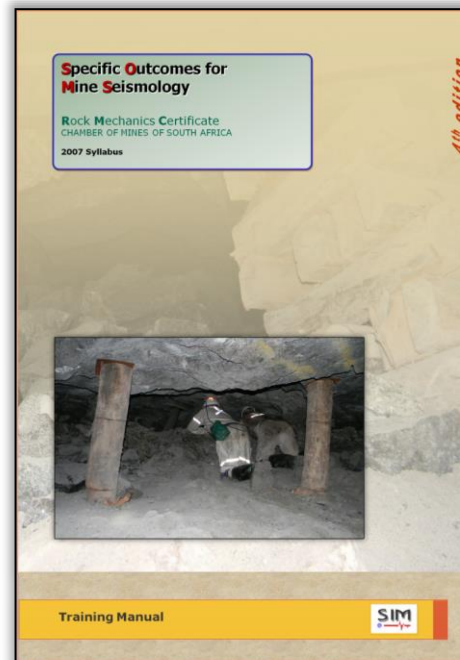
- **Research outcome 3:**
  - ***Training materials for rock engineering personnel***

Manuals

Visuals







8. How were the research outcomes achieved?

- **Research outcome 4:**
  - ***Seismic system audit protocol in line with SIM100301 guidelines.***

Seismic system score card | Mine/shaft: Dishaba | Assessed by: WB and FE | Date: 15/3/2016

Section No.	Criteria	Comments	Score
			7/10*40% = 28%
1. Seismic network planning, system settings & configuration	1. Monitoring objectives defined for different areas of the mine.	According to TSD, 5 standard MonObs declared (Jager & Ryder, 1999). Some cannot be met due to low seismic activity levels (2.6 events per day).	✓
	2. Network station configuration planned according to monitoring objectives.	Originally installed for MER mining.	✓
	… sites added to reduce … epth.	1 shallow site; data show high z-error (see below)	✓
	… defined to ensure minimum … es.	No.	×
	… eedy sensor installation (<3 months).	Average 2-4 years; low priority due to low risk level.	×
	6. Filter settings and sampling rate match relevant Magnitude range.	Yes (1.65 to 3.3kHz)	✓
	7. At least 80% of stations operational at all times.	80-90%, but slowly decreasing (see below); major faults with short repair times.	✓
	8. Sensor health checked and reported on, and always above 80%.	Checked and reported: usually above 80% (see below).	✓
	9. Sensor orientation and polarity checked (not required for smart sensors).	Not done for Dishaba and Tumela	×
	10. Synchronisation of system clocks for regional events.	GPS time base; suitable for exchange with neighbouring networks.	✓

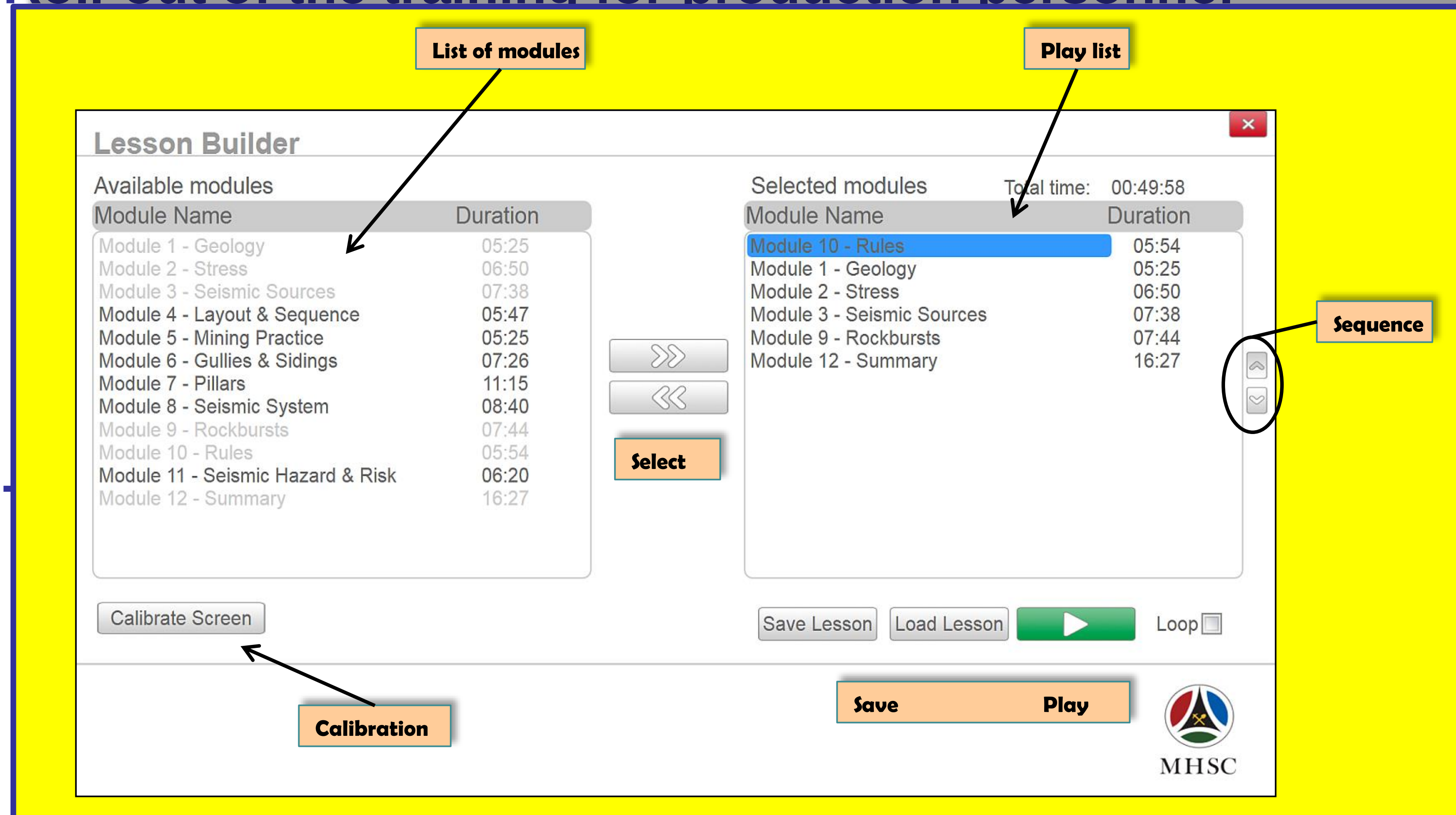
[1] Principal sites receive priority with respect to repair and maintenance and are each equipped with a UPS.

* Bonus question: Were calibrations blasts used to calibrate source parameters, e.g. location accuracy? __Use confirmed rockburst locations as master events_

1. **Network planning**
2. **Source quantification**
3. **Analysis & reporting**

10. Implementation of research outcomes

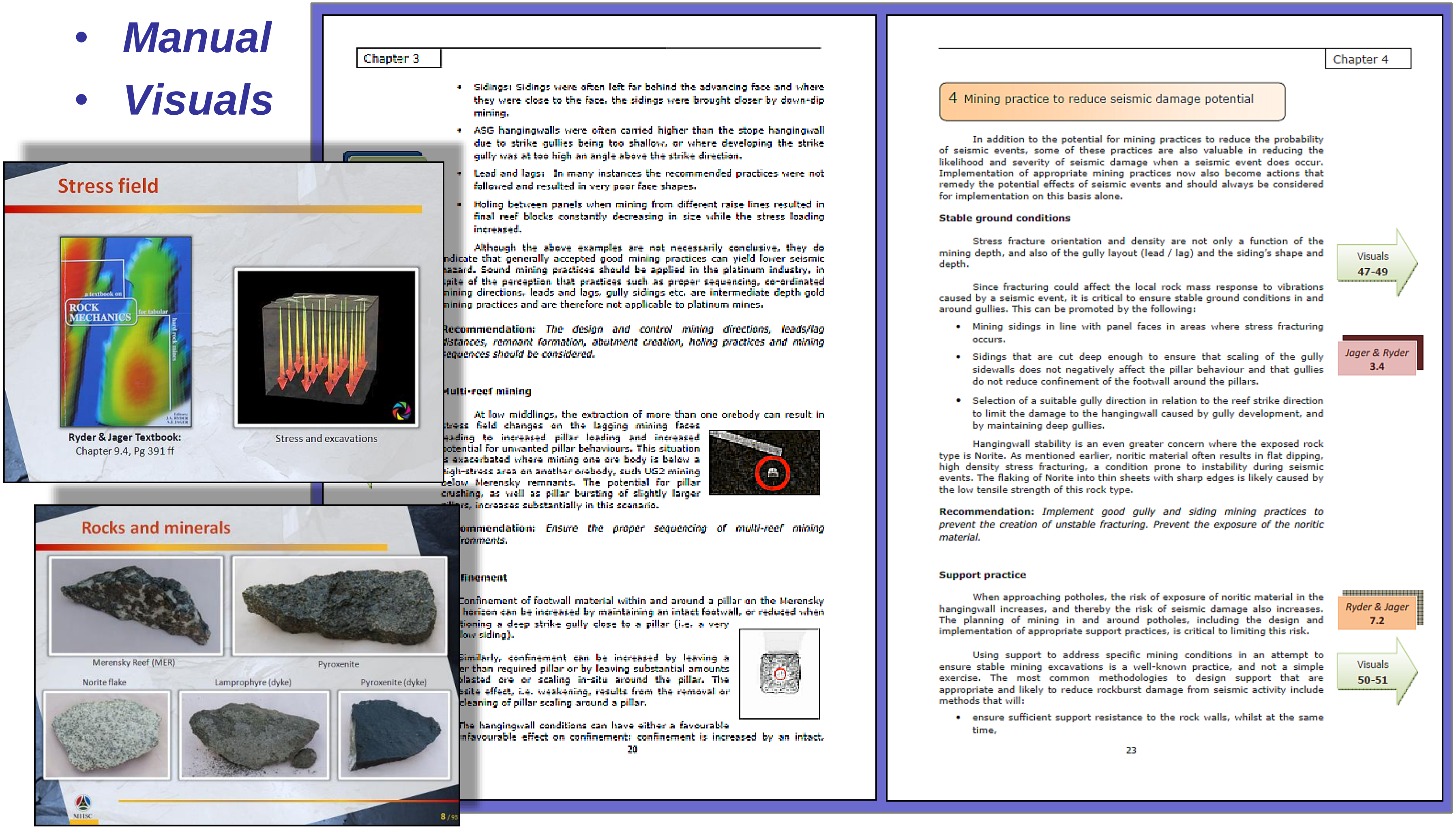
- Roll-out of the training for production personnel



- Audit reports distributed, results presented to SANIRE

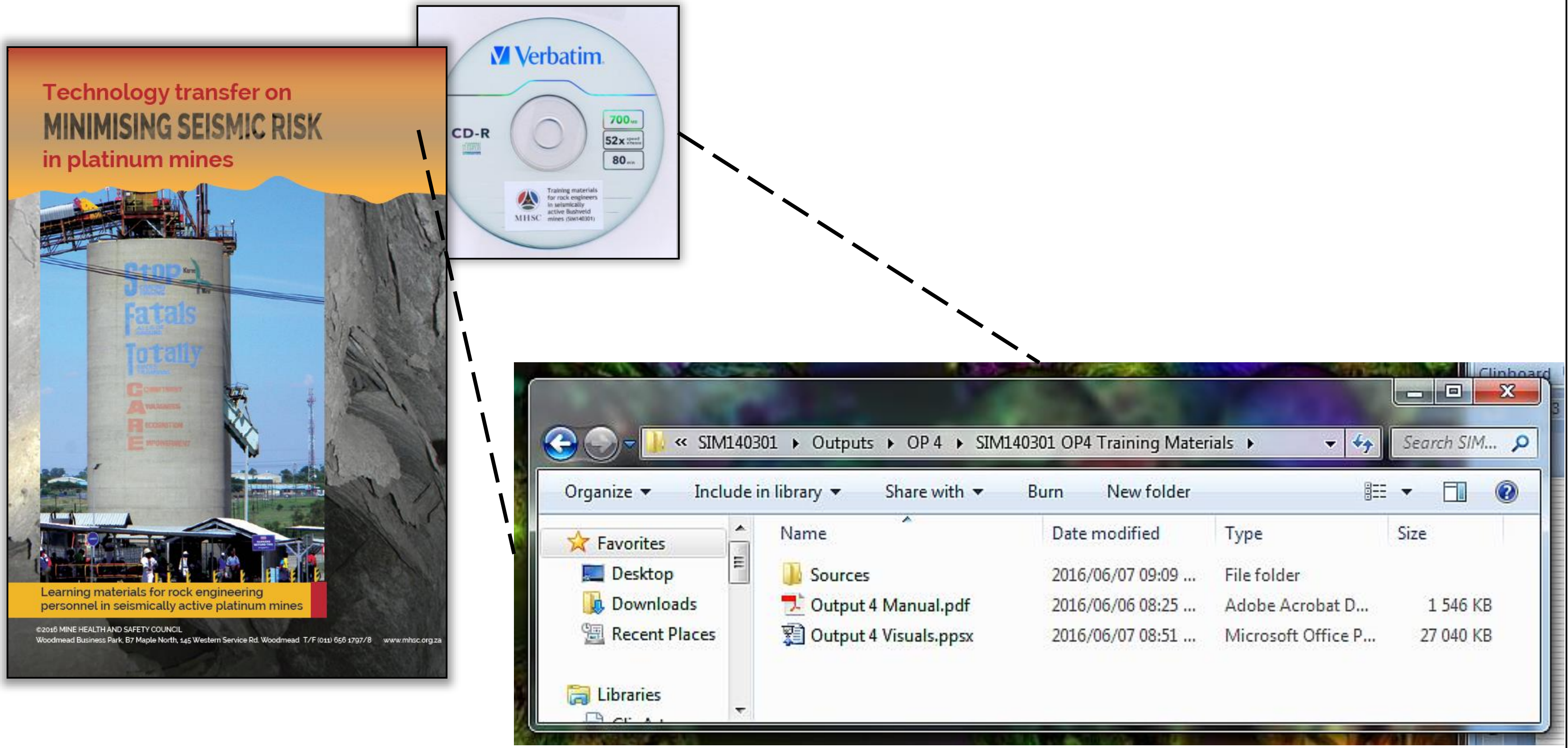
10. Implementation of research outcomes

- **Research outcome 3:**
  - *Manual*
  - *Visuals*



10. Implementation of research outcomes

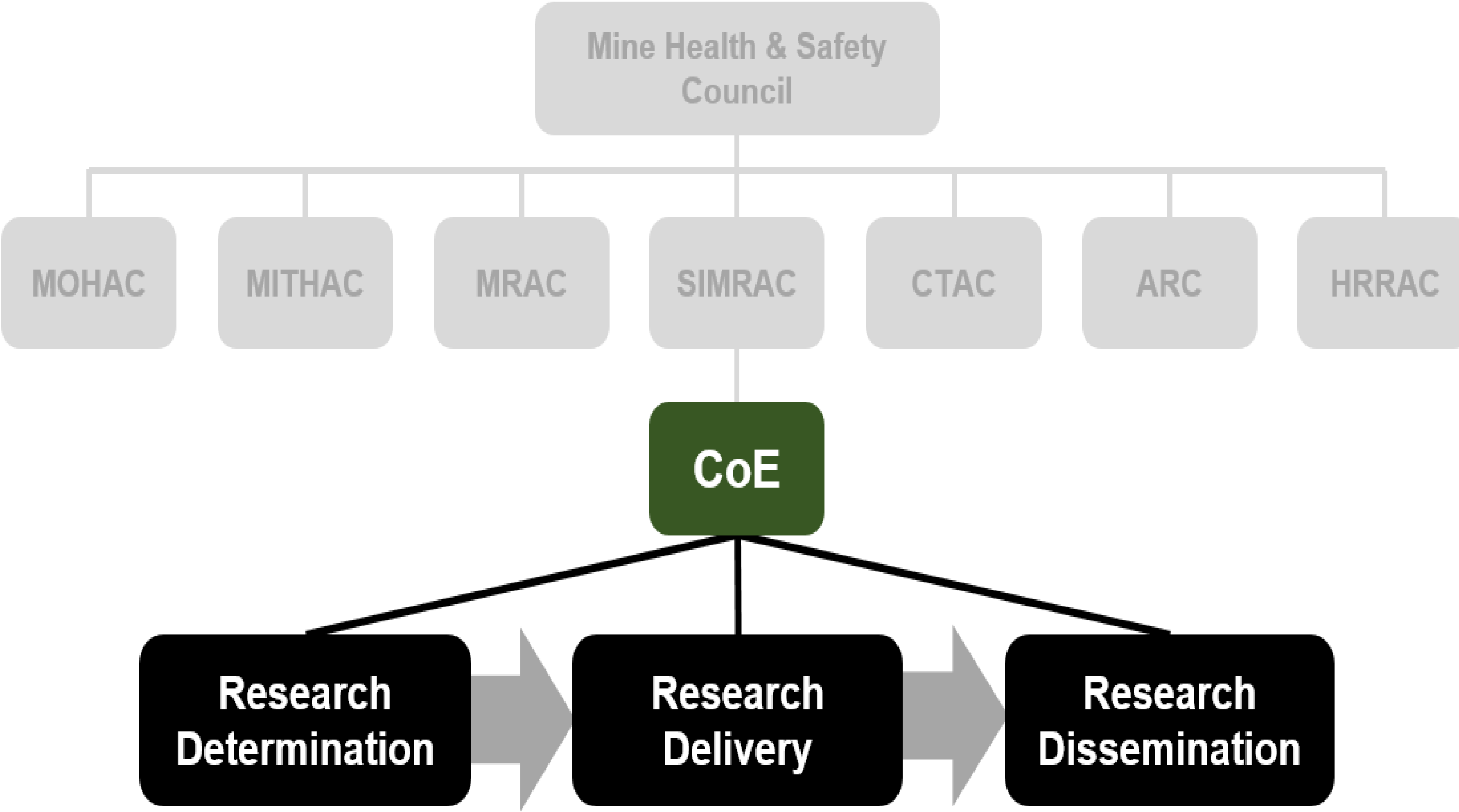
- **Research outcome 3:**
  - ***CD with sources and references***



11. Research Conclusions

- **Summary:**
  - ***SIM140301: Technology Transfer project successfully completed***
  - ***Three independent output streams reached the target stakeholder mines***
  - ***Benefit of increased knowledge levels and awareness of rockburst risk in PGM mines***
  - ***Set new standard in state-of-the-art training methodology at stakeholder training centres.***

12. MHSC New Structure



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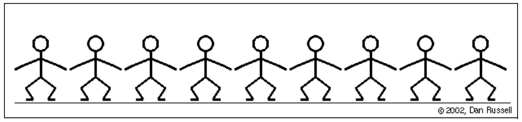

Any Questions?

Thank you

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