

PUBLISHED REPORTS - MINING/ENGINEERING

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REPORT 8	CLEMENTS, K. and FRASER, R W, 1984. "The contribution of the extractive industries to the Western Australian economy".	MERIWA Project 31 [Fiche \$25.00, Hardcopy \$70.50]
<p>The extractive industries were shown in a variety of research reports to make a contribution to the WA economy which is considerably greater than casual observation of, for example, employment statistics would suggest. This extra contribution stems from the complex links of the extractive industries to the rest of the WA economy. Links which are only measurable with sophisticated computer models of the economy, known as ORANI-WA, will allow future research to undertake more precise measurements of these and other characteristics of the WA economy.</p> <p>KEYWORDS: Economics/Computer programmes/Extractive industries/ORANI-WA/Western Australia.</p>		
REPORT 28	RILEY, T.W, 1986. "The development of a railhead gauge for ore haulage railways".	MERIWA Project 28 [Fiche \$5.00, Hardcopy \$28.50]
<p>A device known as a Railhead Gauge was developed to measure and record the profile of the head of a rail while that rail was <i>in-situ</i> in an operating railway. The data are recorded on a solid state memory module which can be removed from the recording device and transferred to a computing system for analysis and preparation of graphical or tabular results.</p> <p>KEYWORDS: Railwear/railway maintenance/laser ranging.</p>		
REPORT 31	MAISEY, J. E. and LYSNAR, R, 1987. "Use of Electronic Distance Measuring (EDM) equipment in underground surveying".	MERIWA Project 54 [Fiche \$5, Hardcopy \$25]
<p>This report describes the satisfactory testing and evaluation underground of a Pentax EDM unit.</p> <p>KEYWORDS: Electronic distance measuring/underground surveying.</p>		
REPORT 34	SMITH, P. G. and SWIFT, J. D, 1988. "An improved nephelometer window for corrosive environments".	MERIWA Project 68 [Fiche \$5, Hardcopy \$35]
<p>This report describes the selection and evaluation from seventeen possibilities of a window material with the durability and corrosion resistance to enable a nephelometer to be used routinely for monitoring the condition of a thickener used in alumina production.</p> <p>KEYWORDS: Bayer process/nephelometer/turbidity measurement.</p>		
REPORT 35	EVANS, A. W., KAWECKI, M. A. and NIKRAZ H, 1988. "Influence of pore pressure variation on sandstone behaviour and its contribution to subsidence and strata behaviour interpretation in the Collie Basin".	MERIWA Project 74 [Fiche \$5, Hardcopy \$41.00]
<p>This project investigated the variation in the mechanical characteristics of saturated, included sandstone aquifers in the Collie Coal Basin as they were dewatered. The methodology adopted consisted of simulating the assumed <i>in-situ</i> conditions on triaxially confined, saturated laboratory specimens, that had been prepared from <i>in-situ</i> core samples. Dewatering was simulated by pore pressure release followed by vertical water flow induction through the specimen. The tests required the design and commissioning of modified triaxial test equipment and the development of a modified triaxial test technique.</p> <p>The report describes the equipment and test techniques, and gives an analysis and interpretation of the results.</p> <p>KEYWORDS: Sandstone/aquifer/pore pressure/dewatering/triaxial/subsidence.</p>		
REPORT 36	PYLE, T., TOWNEND, P. H. and PITRUN, M, 1989. "Repair of fatigue damage in welded joints".	MERIWA Project 58 [Fiche \$5, Hardcopy \$46]
<p>With the use of suitable conditions, it is possible to remelt along the toe of a weld which has been subject to fatigue stressing. This effectively removes the accumulated damage due to the fatigue cycling if the fatigue crack has not been allowed to grow too deep. Retesting of fatigue specimens after treatment shows that substantial increases in the fatigue life can be achieved by the process.</p> <p>KEYWORDS: Metal fatigue/welding/weld repair/fatigue crack/annealing welds.</p>		
REPORT 37	VAN MANEN, P. and RILEY, T. W, 1988. "The development of a load monitoring, display and reporting system for shovels".	MERIWA Project 37 [Fiche \$5, Hardcopy \$32]
<p>The development of a micro-processor-based load monitoring equipment for wire rope shovels began in 1984, and a prototype system was built, installed and commissioned, after which a pre-production system was installed at a second mine site.</p> <p>KEYWORDS: Mining/wire rope shovels/load monitoring.</p>		
REPORT 48	PYLE, T. and ALLEN, D, 1993. "Agitator design for leaching".	MERIWA Project 91 [Fiche \$5, Hardcopy \$31.50]
<p>Two phenomena are used to produce maximum mixing with minimum energy input; they are turbulent flow and cavitation. By repeated testing of different profiles for agitator blades rotating on a vertical axis in a large cylindrical flat-bottomed tank, an optimum design has been developed.</p> <p>KEYWORDS: Leaching/pulp/turbulence/cavitation/agitation.</p>		
REPORT 53	BLAIR, D. P. and LITTLE, T. N, 1990. "Measurement and control of blast vibration and airblast overpressure in the Eastern Goldfields of Western Australia".	MERIWA Project 94 [Fiche \$10, Hardcopy \$45.50]
<p>A baseline study of airblast and ground vibration was conducted for current blasting practices in open pits on the Golden Mile. This study resulted in a comprehensive data base which showed airblast levels up to 130 Db Linear and vibration levels up to 10 mm/s at the mine lease boundaries. The results obtained with a recently developed infra-red monitoring device clearly highlighted its potential for the detection of individual blasthole events within a production blast, and thus its potential for blast diagnostics with regard to misfires, etc.</p> <p>KEYWORDS: Blasting/vibration/airblast/measurement/infra-red/monitoring/misfires.</p>		

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REPORT 62	PYLE, T. and TOWNEND, P. H., 1991. "Corrosion of bus superstructure components".	MERIWA Project 76 [Fiche \$5, Hardcopy \$61.50, CD-Rom \$50]
<p>Problems experienced with corrosion of the coachwork of passenger buses operating in remote areas have been studied in an attempt to explain the reasons for the accelerated corrosion.</p> <p>KEYWORDS: Corrosion/metal/coachwork/structure/remedy.</p>		
REPORT 63	DUNN, J. G. and PRICE, R. E., 1990. "Factors that affect splice strength in conveyor belts".	MERIWA Project 86/M115 [Fiche \$5, Hardcopy \$37]
<p>A laboratory scale convey belt splice apparatus has been constructed that enables splices to be made under controlled conditions of pressure and temperature. The apparatus was used to investigate a number of variables associated with the construction of a belt splice, including pressure, vulcanisation temperature, rubber systems from different manufacturers, vulcanisation time, humidity and the effect of buffing the wire cord relative to an unbuffered cord.</p> <p>KEYWORDS: Conveyor/belt/splice/strength/rubber/vulcanisation.</p>		
REPORT 79	HEWSON, G. S., TIPPET, P. J., O'CONNOR, B. H., RALPH, M. I. and EVANS, S., 1991. "Preliminary study of radon in underground mines in Western Australia".	MERIWA Project M174 [Fiche \$5, Hardcopy \$40]
<p>Twenty-seven mines (zinc/lead, gold, nickel, coal), employing 80% of the W.A. underground mining workforce, were surveyed to measure the decay products of radon in mine air. Passive CR-39 track etch monitors were installed in the mines for periods of up to 6 months to measure the long-term average levels of radon gas. Parallel sampling of radon daughters was conducted over the same period at some of the mines. The radon daughter sampling was carried out using alpha NUCLEAR PRISM II automatic monitors and the Kuznetz grab sampling method.</p> <p>KEYWORDS: Radon/progeny/underground/mines/health.</p>		
REPORT 98	TURNER, J., ROSEN, M., MILLIGAN, N., SKYLASH, M. and TOWNLEY, L., 1993. "Groundwater recharge studies in the Kalgoorlie region".	MERIWA Project M146 [Fiche \$15, Hardcopy \$93. CD-Rom \$50.00]
<p>Results obtained from research into rates of groundwater recharge to hypersaline palaeochannel aquifers in the eastern goldfields region of Western Australia are described. Techniques used in the investigation included measurement of the natural abundance of environmental isotopes such as oxygen - 18, deuterium, carbon - 13, carbon - 14, chlorine - 36, sulphur - 34, uranium 234/238 and strontium 87/86 in the groundwaters. The measurements were used to estimate groundwater residence times and to determine the interrelation of groundwaters in the palaeochannel aquifers with those in fractured rock aquifers and salt lake environments. Numerical modelling was used to evaluate the groundwater resource potential of various palaeochannel systems.</p> <p>KEYWORDS: Groundwater/hypersaline/abstraction/discharge/recharge/resource management/isotopic ratios.</p>		
REPORT 101	SWINDELLS, C. F., FARMER, D. and MONTGOMERY, B., 1993. "Application of small format terrestrial photogrammetry in monitoring open pit mine wall stability".	MERIWA Project M177 [Fiche \$10, Hardcopy \$42.50]
<p>Results of research carried out into the application of small format analytical photogrammetric systems for geotechnical analysis in modern open pit mines, are presented. Techniques using inexpensive 35mm and 70mm cameras with personal computer-based small format stereo-digitisers (Adam MPS2) are investigated with respect to their use in spatially locating and defining geotechnical features and analysing and monitoring open pit stability.</p> <p>KEYWORDS: Open pit/mine wall/stability/photogrammetry/stereodigitiser/small format.</p>		
REPORT 136	DUNN, J. G., ENTWISTLE, R. D and PRICE, R. E., 1994. "Ageing characteristics of conveyor belt splices".	MERIWA Project M198 [Fiche \$10, Hardcopy \$56.00]
<p>Rubber splice kits were characterised, and samples were vulcanised and subjected to ageing in air in ovens at 60, 80, 90 and 100°C for periods of up to several months. Temperature and access of oxygen are the most significant factors in the ageing process, the fastest ageing occurring at temperatures of 100°C in air. Metal-rubber bonding, and the ageing of metal-rubber bonds, were tested by measuring pulloff strengths for flat plate samples. The effects of etching the metal surfaces prior to bonding were assessed.</p> <p>KEYWORDS: Ageing/rubber/splice/conveyor belt.</p>		
REPORT 140	GOLDSMITH, C. R. D., BRICE, S. J. and EVANS, A. W., 1995. "An investigation of the controls on shallow subsidence in the Collie Basin".	MERIWA Project M226 [Fiche \$30, Hardcopy \$181.50, CD-Rom \$60 (incl. 2 coloured maps)]
<p>Sinkhole subsidence occurs when the roof strata of shallow underground voids fail, and progressive upward failure results in collapses of the ground surface. Areas of sinkhole subsidence were located and mapped in the field. A model for sinkhole formation was formulated using data from the literature, geotechnical field investigations and a laboratory testing program. The potential to map the workings from the surface using geophysical techniques was investigated.</p> <p>KEYWORDS: Subsidence/sinkhole/coal/rehabilitation/Collie Basin.</p>		
REPORT 143	ROWE, P. G., 1995. "Mid-shaft cage arrestor".	MERIWA Project M218 [Fiche \$5, Hardcopy \$27.50]
<p>The development of a concept for a device to prevent a conveyance from free-falling down a shaft after a hoisting system failure is presented, and a survey of drum winder hoisting installations in Australia was made to assess the likely application of the device.</p> <p>KEYWORDS: Mine shaft/hoisting system/conveyance arrestor/drum winder.</p>		

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REPORT 154 TURNER, J. V., BARR, A. D., CHALLEN, R. P., JOHNSON, S. L., TOWNLEY, L. R., WRIGHT, K. D., WOODBURY, R. J., WATSON, G. R., BARTLE, G. A. and GAILITIS, V, 1996. "Groundwater supply to the mining industry in the WA Goldfields".

MERIWA Project M217

[Fiche \$15, Hardcopy \$102, CD-Rom \$50.00]

The role of induced recharge to the paleochannel aquifers from low permeability, saturated formations that bound the producing aquifers was investigated, and a quasi two-dimensional model was constructed using a number of vertical one-dimensional aquitard models coupled with a single one-dimensional aquifer model to represent a paleochannel. Quicklook microfiche and Landsat MSS imagery were selected to investigate the hydrologic behaviour of salt lake flooding in the Eastern Goldfields. There is potential for surface water from impoundments to be used in gold processing and for artificial recharge of the paleochannel aquifers.

An economic model estimating the value of water in gold processing was developed. The purpose of this analysis was to provide a regional, aggregated indication of the likely lifetime of the groundwater resources.

KEYWORDS: Groundwater/Eastern Goldfields/recharge/salt lakes/economics.

REPORT 156 MISICH, I J and EVANS, A W, 1997. "Subsidence due to underground mining in the Collie Basin".

MERIWA Project M165

[Fiche \$30, Hardcopy \$229, CD-Rom \$50]

This project was developed to improve on earlier subsidence prediction and management models developed in the Collie coalfields. The results of the study are the following:

- further confirmation and better definition of the empirical design approach previously established;
- an increased level of understanding of subsidence mechanisms of the Collie Basin strata;
- allowance for the calibration of SUBSOL[®] for prediction of surface subsidence and on-seam stresses for any extraction panel geometry and depth of cover;
- establishment that the most effective method of subsidence management for Wongawilli extraction under the geological and economic conditions is adoption of "panel/pillar" coal extraction methods;
- development and successful trialling of a design approach and design criteria for prediction and management of surface and subsurface subsidence resulting from panel/pillar mining.

KEYWORDS: Underground coal mining/subsidence modelling/centrifuge modelling/"panel/pillar" mining.

REPORT 167 PAN, J., NORTON, M. P., PAUROBALLY, R., PENG, H. and BAO, C, 1996. "Development of adaptive based active noise control ear defenders for the resource industries".

MERIWA Project M210

[Fiche \$20, Hardcopy \$103, CD-Rom \$50.00]

The principal aim of the project was to investigate the analogue and digital control of noise in headsets, and one outcome was a prototype active noise control ear defender, for Western Australian industry. To help alleviate the excessive noise levels often found in many important Western Australian resource industries, the researchers set out to develop an ear defender capable of >15dB reduction in tonal noise transmission and periodic impact noise, with different control systems for differing environments.

KEYWORDS: Noise/noise control/ear defenders/active noise control.

REPORT 171 NORTON, M. P. and KARZUB, D. G, 1996. "The prediction of dynamic stress in structures due to air- and structure-borne sound and vibration".

MERIWA Project M169

[Fiche \$20, Hardcopy \$102.50, CD-Rom \$50.00]

The aim of the project was to investigate three different methods for the prediction of dynamic stress and strain in randomly vibrating structures, from measurements of vibrational velocity. The spatial distributions of dynamic strain and velocity in randomly excited beam, plate and cylindrical shell structural elements were also studied, and the most significant factors affecting the narrow-band and broad-band response of structures, and location of maximum overall dynamic strain, were identified.

KEYWORDS: Dynamic stress/dynamic strain/prediction methods/vibrational velocity/structural elements.

REPORT 185 HILL, A B and SOW, E, 1997. "Model research programme for hydrodynamic response of an air lifted gravity-based structure in limited water depth".

MERIWA Project M291

[Fiche \$5.00, Hardcopy \$56.50, CD-Rom \$50.00]

The research programme provided a preliminary guide for designers concerned with the required still water Under Keel Clearance (UKC) and still water Water Plug Height (WPH) of air-lifted Gravity Based Structures (GBS) with skirts, for floatout through very shallow (<12m) water in a mild seaway. The modelling provided an excellent understanding of the effects of trapped air volumes on wave-induced dynamic motions, for varying values of UKC. The effects of UKC reduction were evaluated in the range of 1.4 - 10.4m for the prototype. At the upper end of this range substantial attenuation in both Heave and Pitch occurs with reduction of UKC, while different trends were found in the lower end of the range.

KEYWORDS: Gravity based structure/air lifted/under keel clearance/modelling tank.

REPORT 186 DING, X., MONTGOMERY, S B., TSAKIRI, M., SWINDELLS, C and JEWELL, R J, 1998. "Integrated Monitoring Systems for open pit wall deformation".

MERIWA Project M236

[Fiche \$10, Hardcopy \$57.00, CD-Rom \$50.00]

The following methods were developed:-

1. The design and optimisation of slope monitoring networks to determine optimum locations of survey instruments and prisms, through computer simulations.
2. Deformation mechanism of slopes, based on the observed deformation data from monitoring surveys, using least squares linear regression analysis technique.
3. Integrating monitored deformation data in numerical modelling of slope deformations.
4. A comprehensive evaluation of the performance and suitability of a robotic survey system for pit slope monitoring which showed a survey accuracy approaching that of manual survey operations.
5. An automatic slope monitoring system for automatic acquisition, transmission and management of deformation measurement data.

KEYWORDS: Slope stability/slope monitoring/pit wall deformation/on-line data logging.

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<p>REPORT 189 NEWSON, T and FAHEY M, 1998. "Research into saline-tailings disposal and decommissioning". Volumes I and II MERIWA Project M241 [Fiche \$35.00, Hardcopy \$250.00, CD-Rom \$50.00]</p> <p>This project aimed to improve understanding of the consolidation behaviour of saline and non-saline mine tailings. Particular objectives included: investigating the consolidation of tailings in the Western Australian gold industry; quantifying the effect of evaporation on consolidation behaviour; investigating the effect of salinity on evaporation from tailings; developing techniques to allow numerical modelling taking account of evaporation; and developing a database on material properties, linking consolidation behaviour to basic tailings properties. A study of the "fate" of cyanide in the tailings was also done. Methods of modelling the behaviour of tailings consolidation were also developed and the computer program MinTaCo developed previously at UWA was refined in the project. KEYWORDS: Mine tailings/evaporation/tailings consolidation/modelling tailings behaviour.</p>
<p>REPORT 190 PACK, D J., FAWCETT, D., EDWARDS, T J., FRIDAY, K and MEIER, K, 1997. "Precise determination of isentropic exponent and speed of sound in hydrocarbons and natural gases". MERIWA Project M269 [Fiche \$10.00, Hardcopy \$61.00]</p> <p>This project made accurate speed of sound measurements, both in hydrocarbon gas mixtures prepared by the <i>Groupe Europeen de Recherches Gazières</i> (GERG) and in locally supplied natural gases at the conditions of temperature and pressure encountered in the North West Shelf gas processing industry. These direct measurements form the basis for development of an accurate (0.1% on speed of sound) composition-based, wide-range equation of state for natural gas mixtures. The principles and techniques of measurement are described, including an acoustic resonance technique for precise speed of sound measurement. The results are fully tabulated and their practical application is discussed. KEYWORDS: North West Shelf gas/isentropic exponent/acoustic resonance/equation of state.</p>
<p>REPORT 201 CLOVER, D., KINSELLA, B., BAILEY, S and De MARCO, R, 1999. "Selection of corrosion resistant steels for use in oil and gas flowlines". MERIWA Project M287 [Fiche \$5.00, Hardcopy \$38.50]</p> <p>In conditions simulating those of an operating flowline, the corrosion resistance of a range of oil and gas pipe steels was correlated with their chemical and physical properties. It was found that the microstructure common in widely used grade B pipe lowers resistance to localized corrosion, and more favourable microstructures were identified. KEYWORDS: Corrosion/pipe steel/microstructure/flowline.</p>
<p>REPORT 207 RANDOLPH, M F., WATSON, P G., BRANSBY, M F and FAHEY, M, 1999. "An integrated study of foundation systems on calcareous sediments". MERIWA Project M268 [Fiche \$10.00, Hardcopy \$52.50]</p> <p>In anticipation of future development of offshore facilities around Australia, this project was undertaken to meet challenges posed by deep water and the possible lack of substantial cemented near-surface sediments. It aimed to formulate a design framework for alternative foundation systems, in weak calcareous sediments, that was calibrated through physical model tests. Project outcomes included soil characterisation, demonstration of the validity of a newly developed load transfer curve formulation for weak sediments, and validation of current design approaches for estimating penetration resistance of cylindrical skirts into uncemented sediments. KEYWORDS: Offshore foundations/calcareous sediments/North West Shelf/load transfer curves/cylindrical skirts.</p>
<p>REPORT 223 POTVIN, Y., NEDIN, P., SANDY, M and ROSENGREN, K, 2001. "Toward the elimination of rockfall fatalities in Australian mines". MERIWA Project M341 [CD-Rom \$50.00]</p> <p>From 1996 an increasing number of mines undertook to document rockfalls, with variable standards of reporting. The database assembled by this project makes possible identification of where most of the risk lies, and evaluation of the impact of changes in industry practise. New standard reporting practises are recommended, and details of the relations between various ground support practises and rock mass failures are discussed at length. KEYWORDS: Rockfall risk/fatalities/mine safety/risk analysis.</p>
<p>REPORT 233 VILLAESCUSA, E., WINDSOR, C R., LI, J., BAIRD, G and SETO, M, 2003. "Stress measurements from cored rock" MERIWA Project M329 [Hardcopy \$59.00, CD-Rom \$50.00]</p> <p>In Western Australia high horizontal <i>in situ</i> stress fields occur in some mines at shallow depths, necessitating improved techniques for measuring stresses. A promising new technique was investigated in this project, which uses acoustic emissions and has several extremely useful attributes. KEYWORDS: Stress measurement/<i>in situ</i> stress field/underground mine stresses/acoustic emissions.</p>
<p>REPORT 237 HUDYMA, M, 2005. "Mine seismicity and rockburst risk management – phase I" MERIWA Project M328 [Hardcopy \$41.00, CD-Rom \$50.00]</p> <p>The project's basic objectives were to address mine seismicity and rockburst risk issues in Western Australian mines, where high stress conditions combine with localized strong rockmass conditions and aggressive mining strategies in some ore bodies. The approaches taken were technology transfer, training and applied research to better understand local problems, based partly on improving the management of seismic monitoring data. KEYWORDS: Mine seismicity/seismic monitoring/rockburst risk/mine risk management.</p>
<p>REPORT 244 BAILEY, S; BOSENBERG, S; KINSELLA, B; LOWE, A, and TAN, Y-J, 2004. "Development of an electrochemical corrosion probe for use in gas and oil flowlines". MERIWA Project M288 [CD-Rom \$50.00]</p> <p>The outcome of this project were the design, construction and testing of a system, that for the first time used the Wire Beam Electrode and Electrochemical Noise Analysis together, and development of an automated switching system. The system was applied successfully to a number of well known corrosion situations in the laboratory. KEYWORDS: Pipe corrosion/steel corrosion/wire beam electrode/electrochemical noise analysis/corrosion kinetics.</p>

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REPORT 247	NEDIN, P and POTVIN, Y, 2005. "Australian Rockfall Research – Phase II".	MERIWA Project M360 [Hardcopy \$150.00, CD-Rom \$50.00]
<p>This study built on the comprehensive database of nearly 800 rockfalls and related data from 1993 – 2003 to improve understanding of the nature of rockfall hazards and risks in Australian mines. Some reduction of risk took place due to changes in development mining practices, but was not sustained. The report also proposes a methodology to assess rockfall risks.</p> <p>KEYWORDS: Rockfall risk/Australian underground mines/rockfall database/risk management system.</p>		
REPORT 249	VILLAESCUSA, E., THOMPSON, A and PLAYER, J, 2005. "Dynamic testing of ground support systems – Phase I".	MERIWA Project M349 [Hardcopy \$91.50, CD-Rom \$50.00]
<p>This project was conceived to design, build and commission a test facility based on a new loading concept involving momentum transfer. The new facility and instrumentation were used to test rock reinforcement systems, and further work was anticipated (M349A). More than 20 specimens, involved in more than 80 tests, were evaluated in this initial project, and computer software for analysis of the large amount of data was also developed.</p> <p>KEYWORDS: Dynamic testing/rock reinforcement system/mining-induced seismicity/ground conditions/mine safety.</p>		
REPORT 251	THIAGARAJAN, K and MORRIS-THOMAS, M, 2005. "Shallow water-tow-out issues of WA-based construction of concrete gravity structures".	MERIWA Project M331 [Hardcopy \$67.50, CD-Rom \$50.00]
<p>After construction, a long-skirted concrete gravity structure (CGS) must be towed along a shallow channel connecting the casting basin to the open sea. Air cushions if used to increase seabed clearance also can increase the dynamic response of the CGS to ocean conditions encountered in tow-out. This report describes model tests and numerical modeling and analyses to understand the interaction of a CGS and its air cushion, that were conducted at the School of Oil and Gas Engineering, UWA.</p> <p>KEYWORDS: Concrete gravity structure/CGS/shallow water tow-out/wave flume/air cushion.</p>		
REPORT 260	HEAL, D; HUDYMA, M; OWEN, M and POTVIN, Y, 2006. "Mine seismicity and rockburst risk management – phase II".	MERIWA Project M355 [Hardcopy \$155.00, CD-Rom \$50.00]
<p>Further developing methods and outcomes from M328, this project had three objectives: maximize the use of seismic monitoring for understanding mine seismicity, develop a quasi-real-time seismic hazard map, and perform seismic risk analyses. By the end of the project the software developed was in use at 15 mines in Australia and Canada. Seismic hazard was shown to correlate strongly to faults, mining width and rock compressive strength, among other factors.</p> <p>KEYWORDS: Mine seismicity/mine safety/seismic risk/mine seismic monitoring/rockburst risk.</p>		
REPORT 263	VILLAESCUSA, E., HASSELL, R, and THOMPSON, A, 2007. "Corrosion of rock reinforcement in underground excavations".	MERIWA Project M333 [Hardcopy \$149, CD-Rom \$50.00]
<p>By undertaking field investigations at eight of the sponsors' minesites, this project set out to determine the main corrosion mechanisms that affect rock reinforcement elements used underground. Objectives included both in situ testing of reinforcement elements and simulated corrosion experiments in chambers at the Western Australian School of Mines. The final report details results of these tests and offers recommendations in practise.</p> <p>KEYWORDS: Corrosion, underground mine, rock reinforcement, corrosion chamber, corrosivity classification.</p>		
REPORT 276	CHANDA, E and KURUPPU, M, 2009. "Evaluation of monorail haulage in metalliferous underground mining"	MERIWA Project M382 [Hardcopy \$116.50, CD \$50.00]
<p>The study investigated the potential of monorail haulage particularly in decline development and main haulage, in view of shortcomings in current practises. A feasible design including a pneumatic system is proposed.</p> <p>KEYWORDS: Monorail/decline development/metalliferous mining mine haulage.</p>		
REPORT 279	WESSELOO, J; DIGHT, P, and POTVIN, Y, 2009. "High resolution seismic monitoring in open pit mines"	MERIWA Project M366 [Hardcopy \$72.00, CD \$50.00]
<p>As economic depths of open pit mines are increasing, with some planned to reach 900m or more, increasing safety and economic risks may follow from the greater uncertainties due to mines' increased stress environment. This project resulted in new insights into brittle fracture processes in rock slopes, and produced data for calibrating numerical models and furthering material models.</p> <p>KEYWORDS: Mine seismicity/seismic monitoring/deep open pit mines/high stress mining environment/mining risk assessment.</p>		
REPORT 281	HEAL, D; HUDYMA, M; MIKULA, P; OWEN, M; POTVIN, Y and WESSELOO, J, 2009. "Broadening the application of seismic monitoring in underground mines"	MERIWA Project M386 [Hardcopy \$225,CD \$50.00]
<p>Seismic monitoring networks in mines and in the Kalgoorlie-Kambalda and Leinster mining districts were maintained and the data analysed. Seismological analysis of several caving mines gave new insight into rock mass failure mechanisms. Techniques for interpreting seismic data in high stress and rockburst-prone mines were also improved, with an update to MS-RAP being developed.</p> <p>KEYWORDS: Mine seismicity/regional seismic network/underground mine caving/mining risk assessment/rock mass failure.</p>		
REPORT 287	VILLAESCUSA, E., THOMPSON, A., PLAYER, J. and MORTON, E., 2010. Dynamic testing of ground central systems.	MERIWA Project M349A [CD \$50.00]
<p>Project M349A was initiated to undertake modifications to the testing facility designed and built in M349, to make test preparations safer and more efficient, as well as to enhance instrumentation and data analysis software. Further achievements were a better simulation of a borehole in rock, and more than 80 additional tests on reinforcement systems.</p> <p>KEYWORDS: Dynamic testing/rock mechanics/mine safety/rock reinforcement/ground support.</p>		