“MRC-WIKI” – A MINE REHABILITATION AND CLOSURE KNOWLEDGE MANAGEMENT TOOL FOR CENTRAL QUEENSLAND COAL MINE PRACTITIONERS

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31 March 2017 – UoN, TFI Mine Rehab Conference, Muswellbrook
1. INSPIRATION

20 YEAR ANNIVERSARY OF CQMRG

50th workshop, Rockhampton, April 2013
OVERVIEW

1. Inspiration for the project
2. Research objectives
3. Methods
4. Research findings
5. Iterative process
6. Conclusions
Game Over!
#d8ChookRaffle
2. RESEARCH OBJECTIVES

• Guide users to knowledge, tools
• Capture less formal knowledge
• Encourage discussion
• Establish a KM system that could be managed by practitioners
3. METHODS

• Undertook Scoping study (2014) – Australian tools
• Reviewed KM tools globally
• Studied KM theory
• Selected Content Management System
• Created MRC-wiki
• Facilitated interaction with/in CQMRG and in SMI
• Encouraged knowledge sharing
• Sought feedback on the wiki
• Improved appearance and function
• Handed the wiki over to the CQMRG
ACARP C23023

INDUSTRY-BASED REHABILITATION AND CLOSURE KNOWLEDGE MANAGEMENT SYSTEM:
SCOPING STUDY

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13 May 2014

SMICMLR
Centre for Mined Land Rehabilitation

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
ACARP C23023 INDUSTRY-BASED REHABILITATION AND CLOSURE KNOWLEDGE MANAGEMENT SYSTEM: SCOPING STUDY

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Objectives
This project evaluated the capacity of existing knowledge management and support tools to sustain a knowledge management system within a resource industry setting. The project aimed to:
1. Identify, select and evaluate knowledge capture tools and other management systems
2. Evaluate the representation, manipulation and dissemination of knowledge in the industry setting
3. Determine if a centralised Mine Closure and Rehabilitation (MCaR) knowledge management system would be the most suitable knowledge management system for the industry.

Method and Results
Evaluation of the selected knowledge management system software tools involved:
- Tools were evaluated for:
  - How useful were the tools
  - The strengths and weaknesses of each system
  - How quickly and easy each system was to use in the context of prior knowledge or additional skills

Conclusions
Effective knowledge management is a critical success factor in achieving sustainable mine rehabilitation and transitioning from active mining through decommissioning to immediate best use. The MCaR project aims to provide a central hub to support professionals with mining and rehabilitation design and planning tasks. The project was supported by ACARP and commenced in March 2013.
Existing tools

1. Guide users to knowledge, already available

2. Capture the less formal knowledge

3. Encourage discussion and ensure access to unpub. knowledge;

4. Be maintained by industry groups, and able to be applied in other regions

(Unger et al, 2014)
KM TOOLS - GLOBAL

• GARD GUIDE
• CLOSEDURE
• HUMAN RIGHTS WIKI
• WATER WIKI
Chapter 1

1.0 The Global Acid Rock Drainage Guide

1.1 Introduction

1.1.1 Acid Rock Drainage

1.2 Acid Rock Drainage Management – The Business Case

1.3 Scope and Objectives of the Global Acid Rock Drainage Guide

1.3.1 Scope

1.3.2 Objectives

1.4 Relation to Other Guides

1.5 Approach of the Global Acid Rock Drainage Guide

1.6 Application to Mine Phase

1.7 The Sustainable Development Approach

1.8 Layout and How to Use the Guide

1.8.1 Layout

1.8.2 How to Use the Global Acid Rock Drainage Guide

1.9 Chapter References

List of Figures

List of Appendices

The GARD Guide

1.1 Introduction

Development of this Global Acid Rock Drainage Guide (GARD Guide) was sponsored by the International Network for Access to Responsible Mining (INAP Alliance). It is the property of INAP. Access and use of the GARD Guide is granted by INAP under certain conditions.

This GARD Guide deals with the prediction, prevention, and management of drainage produced from sulphide mineral drainage (SD), “acid mine drainage” or “acid and metalliferous drainage” (AMD), “mining influenced water” (MIW), and addresses metal leaching caused by sulphide mineral oxidation. While focused on mining, the technology described was used in other activities such as rock cuts, excavations, tunnels. Some of the approaches in the GARD Guide are also applicable to other minerals in other activities.

The GARD Guide is intended as a state-of-practice summary of the best practices and technologies to assist mine operators with managing Sulphide mineral oxidation. The GARD Guide will be of interest to the following:
Welcome to the Closedure Project Pages and Wiki! Closedure is a project that will produce an open Internet resource on technologies and approaches used in mine closure. A major part of Closedure is to identify and systematically evaluate technologies that can be used to achieve selected closure objectives.

The overall aim of the Closedure project is to improve one of the most crucial points in eco-efficient mining: mine closure. The expected outcomes are:

- Reduction in adverse environmental, societal, and economic effects related to closure of mining operations
- Easier, better informed selection of technical methods for key closure operations
- Smoother mine closure planning and permitting processes

Latest in Wiki

- Enonkoski
  10.04.2015
- Yhantti
  10.04.2015
- River and lake sediment sampling
  09.04.2015
- Sediment sampling
  09.04.2015
- Soil and sediment sampling
  09.04.2015
- Permeable reactive barrier
  09.04.2015
- Biologic sulphate reduction in mine shaft lakes
  08.04.2015
- Active treatment technologies
  08.04.2015
- Sulphate reduction in reactors
  08.04.2015
- Isotope methods in groundwater studies
  07.04.2015

Welcome to the Water Wiki!

The IWA Water Wiki provides a platform for the global water community to interact and share knowledge online.

If you are new to the site, please Register to get started. For Help, see How to Register.

If you have already registered:
- Create a personal Profile
- Create a profile for your organization or research group

If you have any questions, please Contact Us

Latest Blog Posts

**USF Graduate Students Launch #Reclaimis Photo and Video Contest**

"Envision a world where we don't run out of clean water, energy or nutrients." This is the vision behind the 2015 #Reclaimis campaign (http://goo.gl/Nur81g). In an effort to foster solutions to global problems associated with waste and the management of water, energy and nutrients, USF graduate students and faculty from civil and environmental engineering, anthropology, and marine science have launched a photo and video contest, where the public is asked to define what "reclaiming" resources means to them. ...

**Guest Post: Water industry highlights hacking and customer engagement as its main challenge in smart metering**

SMA's 4th annual Smart Water Systems conference will strengthen skills in water management whilst keeping attendees at the forefront of technological breakthroughs to adapt to the growing need for water efficiency. The agenda features over 19 case study presentations from across the globe. ...
PROJECT TIMELINE

- CQMRG circulate Scoping Study to members, Feb 2015 start
- Review of Content Management Systems
- Planning of workshop 1 with CQMRG
- Mackay CQMRG/MRC-wiki workshop May 2015
- Develop wiki structure
- Brisbane SMI/CQMRG MRC-wiki writing workshops Dec 2015
- Legal, copyright aspects clarified
- Content writing
- Wiki FAQs
- Springsure CQMRG/MRC-wiki workshop May 2016
- Content writing
- Content writing
- Handover meetings with CQMRG Dec 2016 and Feb 2017
- Handover to CQMRG

- Selection of most suitable CMS and features
- Cloud hosting established
- Established CQMRG working group
- Established CQMRG working group
Effective knowledge exchange (Reed et al, 2014)

- Design
- Engage
- Represent
- Impact
- Reflect and sustain
KM THEORY...

Networks of knowledge (NoK) highlight the importance of

- The dynamic amongst individuals
- Relationship between groups
- Understanding motivation for participation (Carmen et al 2015)

Critical interface between academics and non-academics

- Incentives for high impact research vs other KT (Olmos-Penuela, et al, 2014)
- Publications not only motivation (Carmen et al 2015)
KM THEORY...

• Value of NoK goes beyond discovering and organising...identify gaps, new ideas, integrate ideas and contribute to informed decision making

• ‘Horizon scanning’...emerging issues (Nesshoever et al, 2016)
KM THEORY…

• Enthusiasm of building a NoK for the future (European biodiversity) (Carmen, et al, 2015)

• Challenges of retirement and staff defection

• Need for structures and ongoing engagement to sustain (Frost 2014)

• Knowledge loss impacts (De Long, 2002)
  • Reduces capacity to innovate and pursue growth
  • More costly errors
  • Less efficiency
4 STRUCTURED WORKSHOPS

• May 2015 Mackay and May 2016 Springsure - CQMRG

• Brisbane SMI workshops December 2015
RECORDED OUTPUT

For later use and analysis
INTERACTION

- ID rehabilitation and closure issues
- Group work and one-on-one interviews
- Summaries presented
- Template trialled
- Recorded outcomes
- NVivo theme organising
- Structured wiki
- Began to populate wiki
## Content Management System Comparison

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$0.04 per Hour or $581 for 3 years

$0.0330 per GB per month $39.60 for 100GB for 1 Year

$0.0120 per GB per month $14.40 for 100GB for 1 Year
4. RESEARCH FINDINGS

- Xwiki preferred CMS
- Cloud hosting deemed most effective for ease of hand over to CQMRG
- More engagement = more content and enthusiasm
- Supportive CQMRG leadership has been essential
- Structure – all themes - planning, implementing, reviewing, improving; across SD (5 capitals) - human, social, infrastructure, environment and financial
4. RESEARCH FINDINGS - CHALLENGES

- Competition for knowledge may limit contribution
- Writing process for a wiki – different to academic and practitioner writing (less formal)
- Different methods are needed to transfer knowledge
- Changing CQMRG composition – both an opportunity and a challenge
- Expansion and contraction of the industry
- Retirement of mature practitioners
- Relying upon volunteers to sustain MRC-wiki
4. RESEARCH FINDINGS - HIGHLIGHT

FIRST ARTICLE – GIL FLETCHER
About the MRC-Wiki project

MRC-Wiki is a Mine Rehabilitation and Closure knowledge management tool primarily focussed on Central Queensland practitioners to support them in their work as well as to draw upon the knowledge base of this group and its historical network. more...

Searchable hot topic links

- Acacia
- actions
- Assets
- Authors
- Biodiversity
- Bingalow
- Budget
- Built capital
- built-environment
- Carbon
- Casuarina
- Closure criteria
- Closure planning
- Column leaching
- Communication
- Community expectations
- completion criteria
- Continual improvement
- contract
- Contributors
- Cumulative impacts
- Data documentation
- Deep ripping
- Deming Cycle
- Earthworks
- Economic
- Efficiency
- EMS
- Equipment
- Erosion
- Eucalyptus
- Exposure
- Final Landform
- Final voids
- Five capitals
- GIS
- Grasses
- guidelines
- heritage
- Human capital
- Hydrology
- Impact detection
- Implementing
- Improvement
- plans
- Improving
- Infiltration
- infrastructure
- Leaching
- Long term
- Lysimeter
- maintenance management
- Material movements
- analysis
- Metaleca
- metrics
- Mine Closure
- Mine spoil monitoring
- Native plant
- Natural capital
- Novel ecosystems
- Open-cut mining
- overburden
- Photos
- Planning
- Post-closure management
- Post-mining land rehabilitation
- Post-mining land use
- Productivity
- Regional planning
- Rehabilitation goals
- rehabilitation performance
- relinquishment
- retained structures
- Reviewing
- Rippling
- Salinity
- Salt
- Seed dormancy
- Seed germination
- Seed storage
- selective handling
- Social capital
- Soil
- Soil health
- Soil organic matter
- Solubility
- Spoil
- Statistical power
- subcontractor
- Subsoil
- Surface preparation
- surface water management
- Sustainable development
- targets
- Termites
- Topsoil
- topsoil management
- vegetation establishment
- Waste rock
- cover
- Water
- infiltration
- Water management
- water management infrastructure
- Weathering
5. ITERATIVE PROCESS

• Each interaction provided new content, understandings of motivations and internal group leadership
• Additional workshops
• CQMRG working group
• Advice on MRC-wiki to improve access, appearance and ease of use
• Alternative article generation methods
INCENTIVES

• Interface between academia and practitioners reveals motivation at personal and professional levels
• Personal ties and group relationships are powerful forces for participation
• Non-financial incentives
• Altruism - desire to share/pass on knowledge
CONCLUSIONS

• Mine rehabilitation and closure knowledge is costly to acquire and easily lost

• Rehabilitation and closure KM requires a long term focus

• Creation of knowledge is not enough - knowledge exchange must be designed into research

• This project aims to make the implicit explicit

• Incentives for participation need to be well understood

• Good planning and iterative development are both important

• Relational aspects are critical within CQMRG to sustain this project
ACKNOWLEDGEMENTS

- ACARP 2014 C23023 Industry-based rehabilitation and closure knowledge management system: Scoping Study
- ACARP 2015-16 C24067 “MRC-Wiki” Mine Rehabilitation and Closure Knowledge Management platform - Implementation for Central Queensland coal mines
- ACARP project monitors Stuart Ritchie, Craig Lockhart and Simon Orton
- Stuart Ritchie, Jemma Purandare - Chair and Secretary/Treasurer of CQMRG
- The University of Queensland Institutional Human Research Ethics Approval number for this project is 2015000674.
- Artwork – Freya Kassulke
http://mrcwiki.org.au

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