

# ISOGATE – A GLOBAL ISOLATION RISK MANAGEMENT DECISION SUPPORT PORTAL

**Guldidar V Kizil** (*Mineral Industry Safety and Health Centre (MISHC), UQ*)

**Tilman Rasche & John Kabel** (*Department of Employment, Economic Development and Innovation (DEEDI) - Division of Mines and Energy*)

## ABSTRACT

Incidents and accidents related to isolation of energies continue to occur within the industry. **“ISOgate: Isolation Risk Management Decision Support Tool”** is an intelligent storage mechanism of isolation accidents and incidents and a real time analysis and reporting tool. ISOgate provides an access to a detailed and comprehensive analysis of acts and conditions that have led to isolation related incidents in general (electrical, hydraulic, pneumatic, vehicle immobility (parking), confined space, etc.).

ISOgate is modelled on the already proven **“TYREgate: Tires and Rims Decision Support Tool”** portal (Kizil & Rasche 2008). Both TYREgate and ISOgate establishment has been funded by the **ACARP** (*Australian Coal Association Research Program*).

This paper introduces the **“ISOgate”**, its key features and benefits including unique **“3 Click Graph Searching Scheme”** and dynamically generated downloadable **“ISOgate Checklists”**.

## INTUITIVE “GATES” MODEL

ISOgate builds on the very successful ACARP project C17032, **‘TYREgate: Tires and Rims Risk Management Decision Support Tool’** (Kizil & Rasche 2008). TYREgate provides industry with a detailed analysis of tyre and rim related accidents, as well as many recommendations towards safety and operational improvements.

A key point of TYREgate is that it forms the “pilot” for like projects towards creation of reliable databanks that will be of assistance across a range of design or safety projects.

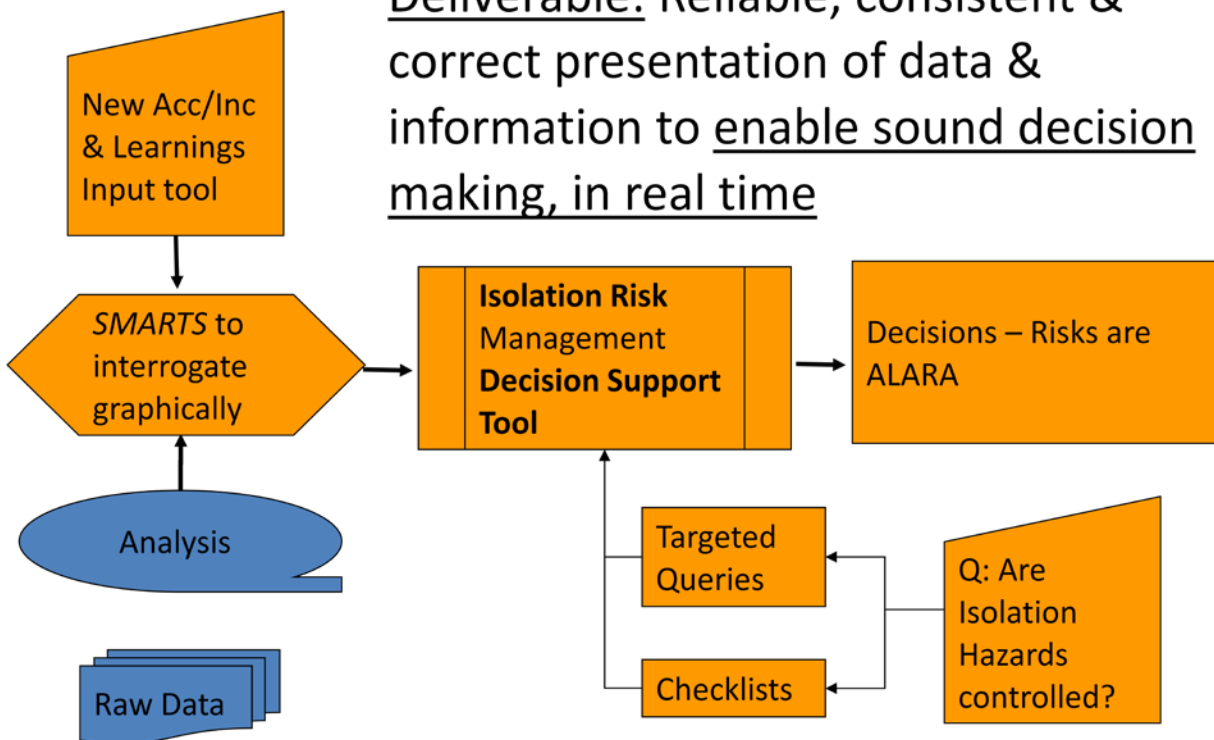
The immediate industry take-up of TYREgate, as measured by 10,000 page views on its website, not only demonstrated the benefit of the project into specific industry safety issues, but it also demonstrated the industry’s need for sound and reliable information in an uncomplicated and easily accessible format.

Like the tyre and rim related accident and incident Causal Factors Database, *TYREgate*, the isolation incident and accident database and reporting portal, *ISOgate*, will be a world’s first searchable causal factors global database and will provide the mining industry with a unique and complete source of information towards improvements.

The project team has developed an innovative and unique **Gates Model**, as illustrated below, and they aim to establish a series of causal factors databases to address major mining risks to provide the mining industry with better and more objective decision making information.

### Intuitive Gates Model

Deliverable: Reliable, consistent & correct presentation of data & information to enable sound decision making, in real time



***The TYREgate / ISOgate project team's vision is as follows:***

***To provide industry stakeholders an intuitive real time gateway tool to a series of integrated and near real time causal factor databases of accident and incident data, and corresponding decision making information towards state of the art risk mitigation, risk management and business improvement – globally.***

### **WHY DEVELOP ISOGATE?**

The Queensland Mining Industry has highlighted '**Energy Isolation**' as a critical area which requires greater awareness, understanding and control. cursory investigation has shown that there have been 32 fatalities related to accidental contact with electricity over the past twenty years in the Queensland mining industry alone. In the period from July 2002 to April 2007, 73 electrical incidents were reported relating to lack of isolation, incorrect isolation, not following SOP or access permit and incorrect installation. The main root causes of these incidents included the isolation of wrong circuits due to incorrect labelling and out of date drawings (Queensland Government DME 2007).

There are many other non-electrical incidents such as hydraulic, pneumatic, other stored energy where “*Less Than Adequate*” isolation played a major role in the accident causation.

To assist the mining industry in better prioritising its approach to isolation, the joint MISHC/DME ACARP funded project has developed “**ISOgate: Isolation Risk Management Decision Support Portal**”. The ISOgate pilot model is fully functional now and it will be released in February 2010. Figure 1 shows the ISOgate Home Page.

ISOgate will form part of MIRMgate and sit adjacent to the recently completed TYREgate portal entry point on the MIRMgate home page. ISOgate will provide a further ‘first call’ portal for information and decision making support on this family of accidents and incidents.

### **ISOGATE DEVELOPMENT**

ISOgate is modelled on the already proven TYREgate portal. ISOgate development involves development of the ISOgate website based on the innovative “**Gates**” **Model** and system specific design and functionality, and population of the system with isolation accident incident data.

ISOgate is a collation of isolation related incident and accident data from the MIRMgate database and other publicly available sources such as Safety Alerts, Safety Bulletins or incident reports as these already provide detailed descriptions of the incidents or accidents, root causes and often risk mitigation steps.

Each accident / incident is analysed by using the Incident Cause Analysis Method (ICAM). ICAM provides logic towards incident and accident causation and supports the notion that most incidents are caused rarely by a single act or condition, but rather by a number of factors working together. Guidewords developed with industry input are used for categorisation of each case.

### **Unique “3 Click” Graphical Search**

ISOgate’s main benefit is not only the collection of many accidents and incidents, their analysis using the ICAM methodology and reporting ability, but rather a graphical interface that presents the proverbial ‘big picture’ as an entry to the database. The graphs are dynamically created to allow ease of access to root and contributing causes of isolation related accident and incident data in “3 clicks”, and risk mitigation recommendations, *ISOgate Checklists* (see Figure 2), that if implemented will have a marked impact in reduction of this type of incident and accident scenario.

‘3 Click’ approach:

**What** are my major risk factors? (Click 1)

**Where** can I find the causes of these factors? (Click 2)

**Why** did these specific accidents occur? (Click 3)

**How** can I mitigate the risks at my own operation? (*ISOgate Checklists*)



**ISOgate**  
ISOLATION CAUSAL FACTORS DATABASE

ISOgate is a Risk Management Decision Support Tool that allows you to analyse a large and diverse range of safety isolation related incidents and accidents, in 'real time'. Results are presented in a range of intuitive graphical formats and reports.

Welcome | About MIRMgate | The Gates | Contact Us | Suggest a Site | Search | Report a Bug

**ISOgate**

Organisational Factors

Task or Environmental Conditions

Individual or Team Actions

Failed or Absent Defences

**Incident**

**Using the ICAM Model**

The ICAM methodology provides the following logic towards incident and accident causation and supports the notion that most incidents and accidents are caused rarely by a single act or condition, but rather by a number of factors working together.

There are a number of ways ISOgate presents this ICAM methodology to allowing comprehensive risk management information in an easy-to-digest fashion.

**Simple 4-step process**

The process generally follows just four simple steps (or just three clicks).

1. Select the ICAM Category
2. Select the relevant section
3. Select the root cause

**Step 1**

Start by selecting an ICAM category.

**Checklists**

Click here to view all of the ISOgate Checklists.

**Disclaimer**

The recommendations provided are suggestions only and may not be applicable for the specific situation at site and must be verified using a site specific risk assessment. ISOgate does not accept any responsibility for the effectiveness or validity of the suggested recommendations.

ISOLATION CAUSAL FACTORS DATABASE

About ISOgate  
ICAM Factors  
ICAM Matrix  
Browse Data  
ISOgate Checklists  
Sample Result  
What is ICAM?  
How to use ISOgate?

ISOgate is a Risk Management Decision Support Tool that allows you to analyse a large and diverse range of safety isolation related incidents and accidents, in real time. Results are presented in a range of intuitive graphical formats and reports.  
©2009 ISOgate

Figure 1. ISOgate Home Page



## ISOgate CHECKLISTS *BY EMESRT RISK*




 <p><b>EMESRT CATEGORY:</b> Stored energy systems, such as accumulators, not able to be isolated or reduced to zero energy</p> <p><a href="#">Click to view this EMESRT Risk</a></p> 	<p>ISOgate Information Address details Contact info here...</p>
<p>ISOgate Reference:2 <b>Compressed Air Pipeline Failure</b> Root &amp; Contributing Causes: • <b>Failure under pressure</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: All mines are strongly advised to conduct an audit / inspection of all pipe ranges to determine if any areas of potential failure exist and to replace suspect pipes.</p> <p><a href="#">Click to view this ISOgate record</a></p>	<p>ISOgate Information Address details Contact info here...</p> <p>Site Answers &amp; Comments:</p>
<p>ISOgate Reference:38 <b>24 Volt High Intensity Discharge Lights</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: This high voltage is a danger to all tradesmen working on this type of light fitting and certain precautions should be taken to ensure personal safety as follows: 1. Any competent tradesman can change a complete light fitting. 2. Only electricians who are competent in the working on this type of light fitting may disassemble and repair them. 3. The light fitting should be totally disconnected from power (24 Volts) before being disassembled. 4. The light should also be disconnected from power for a minimum of 5 minutes before being worked on. This will allow any stored energy to be safely discharged before internal terminals are exposed. 5. When faultfinding and repairs are complete, the light fitting is to be fully and completely assembled before testing on 24 Volts. 6. All lights should have an appropriate warning sticker put on the top of the fitting before they are installed.</p> <p><a href="#">Click to view this ISOgate record</a></p>	<p>ISOgate Reference:95 <b>Contractor Fatally Injured By High-Pressure Hydraulic Equipment</b> Root &amp; Contributing Causes: • <b>LTA Isolation</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: cannot be conducted on equipment that is pressurised. A process to positively isolate the system or parts of a system by lockable means. 6. A process to identify if pressure is contained in a system and a means to drain pressure from a system without disconnecting fittings. 7. A process to take fluid samples from a system safely without the need to disconnect fittings and access to high-pressure points for sampling using specific purpose-designed equipment. Fit-for-purpose equipment suitable for the intended use must be used. 8. Clear identification of high-pressure, medium-pressure and low-pressure fluid lines.</p> <p><a href="#">Click to view this ISOgate record</a></p>
<p>ISOgate Reference:96 <b>Stored Energy</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: 1. Mines consult with the OEMs for the recommended procedure and equipment to install and remove the roof supports. 2. Review the equipment and components of the installation and recovery hoses for fit for purpose application. 3. The isolation valves should be the positive lockable type and the bleed valve (lockable type) should be capable of releasing the hydraulic pressure in a controlled state. 4. All procedures should include positive isolation instructions (i.e. use lockable hydraulic isolation valves, with bleed valves that release the hydraulic pressure in a controlled manner away from all employees, use a diffuser refer photo 3) and the depressurisation must be proven e.g. with a pressure gauge (Refer Drawing 1). 5. The pressure line must be connected to the relative ports, and return line must be connected back to tank at all times. 6. The hydraulic system must have pressure relief in the event of over pressurisation. 7. If possible reduce the installation pump pressure (e.g. from 350 Bar to say 150 Bar) to activate the roof supports. (Usually reduced pressure is used on the installation face not the recovery face) 8. Review SAOS-01 Change Work Practices, Employer Obligations.</p> <p><small>Disclaimer: The recommendations provided are suggestions only and may not be applicable for the specific situation at site and must be verified using site specific risk assessment. ISOgate and ACARP do not accept any responsibility for the effectiveness or safety of the recommendations.</small></p>	<p>ISOgate Reference:95 <b>Hit By Projectile</b> Root &amp; Contributing Causes: • <b>LTA Isolation</b> • <b>LTA work method</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: A well written Standard Work Procedure would require:- Full isolation of the support pressure and isolation of the return line when the leg pressure was reduced to zero. A test of the hoses to feel for free movement indicating no residual pressure. Position of the person out of the line of fire. <b>AT NO TIME SHOULD A TIGHT VALVE BE BLOWN OUT OF ITS SEAT USING SYSTEM PRESSURE!</b></p> <p><a href="#">Click to view this ISOgate record</a></p>
<p>ISOgate Information Address details Contact info here...</p>	<p>ISOgate Reference:55 <b>No means to verify zero energy state</b></p> <p><a href="#">Click to view this EMESRT Risk</a></p> 
<p>ISOgate Reference:211 <b>Electric Shock From Circuit Breaker</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: 1. All operations should have a "Test Before Touch" policy. 2. The policy should ensure that electricity workers prove circuits are de-energised before working in proximity to them by using a fit for purpose multi meter and / or non contact voltage detecting device. 3. All operations should review commissioning procedures for electrical installations to ensure that commissioning tests are conducted for new, modified and repaired installations in accordance with relevant legislation and standards.</p> <p><a href="#">Click to view this ISOgate record</a></p>	<p>ISOgate Information Address details Contact info here...</p> <p>Site Answers &amp; Comments:</p>
<p>ISOgate Reference:211 <b>Electric Shock From Circuit Breaker</b> Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest: 1. All operations should have a "Test Before Touch" policy. 2. The policy should ensure that electricity workers prove circuits are de-energised before working in proximity to them by using a fit for purpose multi meter and / or non contact voltage detecting device. 3. All operations should review commissioning procedures for electrical installations to ensure that commissioning tests are conducted for new, modified and repaired installations in accordance with relevant legislation and standards.</p> <p><a href="#">Click to view this ISOgate record</a></p>	<p>ISOgate Information Address details Contact info here...</p> <p>Site Answers &amp; Comments:</p>

Figure 2. ISOgate Checklist examples



### **Link to Earth Moving Equipment Safety and Round Table (EMESRT) Design Philosophies**

While there are a number of documents available that provide sound advice on Isolation procedures, these may not provide the background on why, and for what reasons, in order of priority, certain actions are required. Also, this advice is often only aimed at the end user, eg the fitter, electrician, and may or may not address the true root and contributing causes such as issues with product design which lie outside the persons scope of influence.

ISOgate has overcome this by directly linking to Earth Moving Equipment Safety and Round Table (EMERST) Design Philosophies through a common field in both databases – namely the EMERST Risk, thereby allowing equipment designers to go from the issue to the solution in a reliable way.

It is believed that without this root cause review, safety improvements around Isolation of energy will continue to remain reactive, rather than proactive, and are likely to continue their focus on less effective means such as procedural ‘fixes’ rather than solutions addressing the root and contributing causes of the mishap such as the design of the equipment or system requiring isolation.

### **CONCLUSION**

The authors firmly believe that ISOgate and its ability to provide information and ongoing communication of its findings will assist in making the mining industry a safer place of work. ISOgate will deliver this through the adoption of recommendations from the industry, Original Equipment Manufacturers (OEMs), industry groups and mining companies’ management.

ISOgate, like TYREgate is not just a database, but a real time analysis, reporting and decision making aid and tool. ISOgate provides the industry and its stakeholders including equipment manufacturers and service providers with:

1. User friendly presentation via MIRMgate portal (industry endorsed), in parallel with TYREgate.
2. Ongoing population of an industry best practice database (revised isolation practices as a result of accidents and incidents)
3. Industry developments in Australia and the rest of the world, reporting of incidents /accidents including technological initiatives.
4. A smart facility within ISOgate that gives the user **“ISOgate Checklist”** around a particular hazard or risk that can be used immediately, without further analysis, in the workplace to check if and how the particular hazard/risk has been addressed.

ISOgate is planned to be launched in February 2010.

The vision for TYREgate / ISOgate is to be the model project towards the development of several other Causal Factors Databases in the Design Philosophy topic areas determined by the EMESRT (<http://www.mirmgate.com/emesrt.asp>) to assist the mining industry with decision making in the medium to longer term.

ISOgate establishment is funded by the ACARP. ISOgate project team would like to acknowledge the ACARP for the opportunity given to develop and implement ISOgate and the previous TYREgate.