



# RISK ASSESSMENT

## CEMENTITIOUS ANCHOR CAPSULES

- CAPCEM 60 CAPSULES



FACILITATED BY: JAG PEARSON

# INDEX

**INTRODUCTION..... 4**

**SCOPE OF WORK..... 11**

**EXECUTIVE SUMMARY ..... 13**

**RISK ASSESSMENT DATABASE ..... 17**

**A - LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY SUPPLIER ... 18**

    RISK PROFILE – LOADING OF ARTICLES BY SUPPLIER ..... 19

    RECOMMENDED SAFE WORKING PRACTICE FOR LOADING OF ARTICLES BY SUPPLIER ..... 23

    RISK PROFILE – TRANSPORTING OF ARTICLES BY SUPPLIER..... 25

    RECOMMENDED SAFE WORKING PRACTICE FOR TRANSPORTING OF ARTICLES BY SUPPLIER..... 28

    RISK PROFILE – OFF-LOADING OF ARTICLES BY SUPPLIER..... 29

    RECOMMENDED SAFE WORKING PRACTICE FOR OFF-LOADING OF ARTICLES BY SUPPLIER ..... 31

**B - STORAGE OF ARTICLES ON SURFACE BY USER: ..... 32**

    RISK PROFILE - STORAGE OF ARTICLES BY SUPPLIER..... 33

    RECOMMENDED SAFE WORKING PRACTICE FOR STORAGE OF ARTICLES ON SURFACE BY USER ..... 35

**C - LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY USER:..... 36**

    RISK PROFILE - LOADING OF ARTICLES BY USER ..... 37

    RECOMMENDED SAFE WORKING PRACTICE FOR LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY USER ..... 41

    RISK PROFILE - TRANSPORTING OF ARTICLES BY USER..... 43

    RECOMMENDED SAFE WORKING PRACTICE FOR TRANSPORTING OF ARTICLES BY USER ..... 45

    RISK PROFILE – OFF-LOADING OF ARTICLES BY USER..... 46

    RECOMMENDED SAFE WORKING PRACTICE FOR OFF-LOADING OF ARTICLES BY USER ..... 48

**D - STORAGE OF ARTICLES UNDERGROUND BY USER: ..... 49**

    RISK PROFILE – STORAGE OF ARTICLES BY USER ..... 50

    RECOMMENDED SAFE WORKING PRACTICE FOR THE STORAGE OF ARTICLES UNDERGROUND BY THE USER..... 51

**E - INSTALLATION OF CAPCEM 60 CAPSULES BY USER: ..... 51**

    RISK PROFILE – INSTALLATION OF CAPCEM 60 CAPSULES BY USER..... 51

    RECOMMENDED SAFE WORKING PROCEDURE FOR THE INSTALLATION OF CAPCEM 60 CAPSULES BY USER ..... 51



COPYRIGHT RESERVED



<b>F - INSPECTION ON ARTICLES BY USER BEFORE INSTALLATION:</b> .....	<b>51</b>
RECOMMENDED INSPECTION PROCEDURE FOR INSPECTION ON THE ARTICLES BY THE USER BEFORE INSTALLATION .....	51
<b>G - INSPECTIONS ON ARTICLES BY USER AFTER INSTALLATION:</b> .....	<b>51</b>
RECOMMENDED INSPECTION PROCEDURE FOR INSPECTION ON THE ARTICLES BY THE USER AFTER INSTALLATION .....	51
<b>H - UNDERGROUND AND SURFACE IMPACTS ON ARTICLES:</b> .....	<b>51</b>
RISK PROFILE – UNDERGROUND AND SURFACE IMPACTS ON ARTICLES .....	51
RECOMMENDATIONS FOR THE PREVENTION OF SURFACE AND UNDERGROUND IMPACTS ON THE ARTICLES .....	51
<b>I - CHEMICAL / HEALTH HAZARDS:</b> .....	<b>51</b>
RISK PROFILE – CHEMICAL / HEALTH HAZARDS.....	51
RECOMMENDATIONS FOR THE TREATMENT OF CHEMICAL CONTACTS .....	51
<b>DESIGN INTENTION</b> .....	<b>51</b>
ADVANTAGES: .....	51
DISADVANTAGES:.....	51
<b>CONCLUSION</b> .....	<b>51</b>
<b>RISK MEASUREMENT INDEX</b> .....	<b>51</b>
<b>RISK CLASSIFICATION</b> .....	<b>51</b>
<b>TECHNICAL DATA SHEET CAPCEM 60* CAPSULE</b> .....	<b>51</b>
<b>MATERIAL SAFETY DATA SHEET – CAPCEM 60 CAPSULE</b> .....	<b>51</b>
<b>WRITTEN UNDERTAKING FROM USER – FORMAT EXAMPLE</b> .....	<b>51</b>

## INTRODUCTION

Fosroc Stratabolt was formed in 1997, by the merger of Stratabolt Products, and Fosroc, both leading suppliers of rock support products to the South African Mining industry. Fosroc Stratabolt now trades as Minova RSA, and is a member of the Minova International Group which manufactures and supplies advanced rock-engineering materials in all of the world's major mining countries.

The company operates an integrated research, development and manufacturing facility in the hub of the diverse and technically demanding Southern African Mining Industry. Minova RSA's products are used in every sector of that industry and are exported world-wide.

Through our own research and access to the research of other Minova International companies we aim to ensure that our customers maintain leadership in improving the safety and productivity of underground excavation. The spectrum of products supplied enables mining engineers to choose unique solutions to unique rock engineering problems. We invite the active participation of our customers in product conception and improvement.

We manufacture resin grouting capsules, cement grouting capsules, high-yield and foamed grouts and other advanced technology cements. We also supply backfilling systems.

## MAIN PRODUCTS

### LOKSET ® polyester resin capsules

Minova RSA manufactures Lokset ® resin rock-bolting capsules under licence from E.I. du Pont de Nemours & Co. (Inc). Lokset ® is the leading rock-bolting resin in Southern Africa and has long held a similar position in North America.

Lokset ® capsules have a unique composition and construction. The resin compartment contains coarse filler particles, which aid in shredding the sheath and then interlock to increase the strength and rigidity of the grout. The catalyst compartment comprises 30 percent of the capsule, which materially improves intermixing of the components. These characteristics



COPYRIGHT RESERVED



give the user unparalleled reliability of installation, tolerance of wide bar/hole annuli and simplicity of operation.

Lokset® is available ex-stock in setting times from 15 seconds to 15 minutes and diameters from 19mm to 35mm. Special setting times and sizes are available on request. The Lokset® capsules manufactured by Minova RSA comply with South African National Standard ("SABS") No. 1534: 1991 and carry the SABS mark of quality.

Minova RSA also manufactures the unique 2-Speedie resin capsule system which contains two different resin set times within the same capsule.

### CAPCEM ® cement grouting capsules

Cement capsules are used with grout bars to achieve full-column cement grouting.

The blended cement is encapsulated in a porous sheath, which allows controlled water absorption for correct wetting of the grout.

Capcem® capsules are available in 25mm and 28mm diameters and fast setting times allowing a 500mm length of grout to support a 50 kN load applied to an embedded 16mm rebar, after only 1 hour.

### TEKSET® high-yield grouts

These patented high-yield grout formulations are designed to be mixed with a fixed quantity of water and pumped under pressure into high strength polypropylene bags for timber pack pre-stressing. The grout will generate a minimum strength of 0,3 MPa in two hours and achieve a minimum strength of 4 MPa within 7 days.

Their primary use is to pre-stress timber packs, giving semi-active and immediate support as well as making the packs blast-resistant. The grouts are also suitable for void filling.

TEKSET® is supplied in nominal 11kg bags.

### AIR-O-CEM® and TEKSEAL® foamed grouts.

When placed with a custom-made pump, these grouts produce low-density foams suitable for void filling and the creation of ventilation, backfill and blast barriers. They are supplied in nominal 25kg bags.

### Pumped cement grouting Systems

The Capram ® system is manufactured by Minova RSA under licence from Delkor Technik.

The system is designed to afford an easy method of reliably achieving full column cement grouting in a hole of any size. It can be used for pre- or post- grouting.

The equipment components are a simple pressure-differential axial pump which operates on compressed air (minimum pressure 3 bar) and a lance of 12mm to 30mm diameter. The grout is pre-packed in a porous sheath designed to optimise water absorption. The wetted grout bag is inserted into the pump and the grout ejected through flexible piping and the lance to the back of the hole. The sheath is retained in the pump and discarded after use.

The pumps are available ex-stock and the grouts are supplied in packages of nominal dimensions 90mm x 400mm long. Setting times are medium (2 hours) and slow (4-6 hours).

The Capcem Injection Grout System consists of blended cement grout (each bag sufficient to fill one typical rockbolt hole) and a hand held, air driven injector. The grout is mixed in its bag with water and then pumped into the hole with the injector.

### LOKSET ANCHOR PACK pourable resin grouts

Scraper winches and other machinery may be rapidly bolted in place with LOKSET ANCHOR PACKS, which are a high-strength pourable resin grouts. They are supplied as a 10kg two-component pack in a mixing bucket. In use, the two components are mixed and poured into the anchoring holes, around the hold-down bolts. The equipment may be used within 2 hours.

### TEKFLEX® structural membrane

Tekflex is a high-strength flexible coating for rock. When sprayed onto the surface of mine drives or tunnels it quickly forms a membrane which restrains loose rock, inhibits further deterioration and protects against weathering.

### CABLESEAL® fire-retardant coating for cable and pipes



COPYRIGHT RESERVED



Cableseal is applied as a coating on cables and plastic pipes in mines. It prevents spread of fire along the cable or pipe runs. It is strongly adherent but flexible enough to accommodate flexure of the cable or pipe without breaking off.

#### FIRESHIELD® fire-resistant coating for timber

Fireshield is sprayed or painted onto timber support in underground workings to prevent spread of fire between packs or poles. It has passed stringent tests that convincingly demonstrate that a timber pack protected by Fireshield will remain intact despite adjacent packs burning completely.

#### FILLSET® AND CONBEX® backfilling systems

Minova RSA has developed additives that make run-of-mine tailings into effective backfill material. The additives bind the tailings and chemically retain water, accelerating strength gain and preventing shrinkage as the backfill sets. Each backfilling operation is unique so Minova RSA provides advice on design of backfill formulations and placing systems.

## FACILITIES

### LOKSET ® resin capsule production

Four capsule production lines employ mechanised and automated mixing to produce polyester and catalyst mastics for encapsulation by modified Kartridge Pak (KP) chub machines. The production lines are supported by a dedicated analytical laboratory for checking of incoming, in-process and finished goods.

Capacity: 500 tonnes per month

### Cementitious grout manufacture

Two automatically controlled blenders produce the grout blends for the packaging lines. Small diameter grouting capsules (Capcem) are formed on 3 banks of automatic filling machines. Large diameter capsules (Capram and Injection Grout) have their own filling section. Two bagging lines produce Tekset, Air-O-Cem, Tekseal and other bagged products. The cements plant has its own Quality establishment, including laboratories for routine quality control and product testing.

Capacity: 2500 tonnes per month

### Research and Development

A central laboratory and workshops are available for development and testing of new formulations and components. Equipment includes compressive and tensile testing machines, apparatus for conventional chemical analyses and rigs for testing anchor installation equipment and techniques.

### Technical Service

All field staff are experienced in mining and have received training in the characteristics and proper use of all our products. Minova RSA service includes:

- \* Product selection
- \* Application training and in-use auditing
- \* Stock management, transport and packaging

## KEY PERSONNEL

<b>Chief Executive Officer – Pete Ferreira</b>		
Educational Qualifications	B.Sc. Eng. (Mining) Pr. Eng, MDP, DPLR, AEP, FSAIMM	
Experience	Section Manager	Anglo American Corporation
	Business Unit Manager	Cementation Mining
	Contract Manager	M&R RUC Ltd – Mining Division
	Operations Manager	M&R RUC Ltd – Mining Division
	Manager Marketing and Business Services	M&R RUC Ltd
	General Manager Mining Services	Murray and Roberts, Cementation (Pty) Limited
<b>Director – Donald O'Connor</b>		
Educational Qualifications	B.Sc. Hons (Geophysics), MBA	
Experience	Project Leader	Western Deep levels Mine
	Project Manager	NPI Group
	General Manager	Strataloc Resins
	Managing Director	Dantex Explosives
	Technical Director	RSA Products
<b>Technical Director – Rod Smart</b>		
Educational Qualifications	Ph.D (Chemistry) Post Doctoral study - Pennsylvania State University, USA	
Experience	Product Development Manager	Fosroc Technology, UK
	Technical Manager	Fosroc South Africa
	Technical Director	Minova RSA
<b>Financial Director – Lindsay Harris-Dewey</b>		
Educational Qualifications	B. Comm., B. Acc., C.A. (S.A.)	
Experience	Audit Senior	Ernest and Young – Springs
	Financial Manager	Bevcan - a Division of Crown Nampac
	Commercial Manager	Bevcan - a Division of Crown Nampac
	Financial Manager	P.F.G. Building Glass
<b>Operations Director – Alfredo Piroddi</b>		
Educational Qualifications	BSc Hons (Management and Industrial Technology)	
Experience	Maintenance Foreman	MCMS
	Production Manager	Coca Cola South Africa
	Factory Manager	Fosroc Stratabolt
	Operations Manager	Minova RSA
<b>Human Resources Manager – Lorraine Coughlan</b>		
Educational Qualifications	B Com. (Personnel Management) Hons	
Experience	Human Resources Manager	HMR and Noristan
	Personnel Consultant	Johann Ribbens and Associates
	Personnel Officer	ESD

The following members contributed in forwarding information in the assessment:

- Dr. R. Smart - Technical Director - 18 Years experience
- W.J. Crous - Technical Manager - 7 Years experience
- J. Bester - Loading Controller - 10 Years experience
- J. Ferreira - Technical demonstrator - 25 Years experience

Mr. Jack Pearson from BRM facilitated the assessment.

## SCOPE OF WORK

**Objective** – To conduct a suitable and sufficient risk assessment that will, as far as reasonably practicable, identify all potential health, safety and financial hazards the articles could pose to the user and measure the level of risk of each hazard identified in order to recommend controls to mitigate or control the relevant risks.

**Aim** – To provide the user with sufficient information – specified steps - that can/should be used to train and guide employees to enable them to use the articles properly.

The risk assessment on the cementitious anchor capsules were structured as follows:

- A** - **Loading, transport and off-loading of articles by supplier**
- B** - **Storage of articles on surface by user**
- C** - **Loading, transport and off-loading of articles by user**
- D** - **Storage of articles underground by user**

- E** - **Installation of Capcem 60 and Conbextra capsules by user**
- F** - **Inspections on articles by user before installation**
- G** - **Inspections on articles by user after installation**
- H** - **Underground and surface impacts on articles**
- I** - **Chemical / Health hazards**

## EXECUTIVE SUMMARY

**Introduction** - The risk assessment on the cementitious anchor capsules considered activities such as loading, off-loading, transport, storage, installation and inspections, which are typical activities the user performance when ever using the articles being supplied. These activities are normally performed on surface and mainly underground. The risk assessment was therefore structured in such a manner that all potential health, safety and financial hazards and relevant risks could be identified, as far as reasonably practicable, whenever performing any of the activities using the articles being supplied. The format of the risk assessment was laid out such, that the user can use the information as specified steps, whenever performing any of the activities using the articles.

Mentioned activities were broken down into specific task steps, as the supplier foresees the user using the articles, then all potential hazards were identified, related risks measured and recommendations made to guide the user of the most effective means in handling the articles when performing such activities.

Risks were measured using a risk index, which considers the three factors influencing the degree of risk such as consequence, exposure and probability (**Refer to APPENDIX 1 for an example of the Risk Index used**). The reason for risk measurement is to prioritize the hazards identified looking at the significant risks it poses, and then deciding whether the risks should be eliminated, controlled, minimized or are the risks perhaps tolerable as is.

**Result** – A detailed hazard identification and risk measurement database is available in section 4 of this report, in summary the highest risks pertaining to each activity is listed below:

**A - Loading, off-loading and transport by supplier:**

- **Loading** - Forklift off-loading pallet incorrectly on truck
- **Transport** - Hi-jacking of truck
- **Off-loading** - Truck on unstable / uneven surface for off-loading
  - Inadequate moving space for off-loading

**B - Storage of articles on surface by user:**

- Ensure fire hydrant in close proximity

**C - Loading, transport and off-loading of articles by user:**

- **Loading** - Insufficient space for loading with forklift
- **Transport** - Transporting material car by hand
  - Using a defective loco for transport
- **Off-loading** - Off-loading into traveling or escape routes

**D - Storage of articles underground by user:**

- Ensure a safe area for storage purposes
- Area demarcated for article storage.

**E - Installation of Capcem 60 and conbextra capsules by user**

- Ensure immediate area is safe
- Ensure required equipment is available for task to be performed

**F - Inspection on articles by user before use**

- Serves as checklist only

**G - Inspection on articles by user after installation**

- Serves as checklist only

**H - Underground and surface impacts on articles**

- Using articles for purposes not designed for.

**I - Chemical / Health hazards**

- High pH from high alumina cement.

**Benefits** – The following benefits resulted from the risk assessment being conducted:

- Legal compliance;
- Mutual understanding between user and supplier regarding hazards and risks when using the articles;
- Specified steps for the user to use the articles properly;
- Revision on the adequacy of design of the articles;
- Recommended safe use of the articles; therefore
- Health and safe working practices;
- Prevention of downtime;
- Reduce potential for production loss;
- Reduce potential for financial loss;
- Reduce potential for personal injury;
- Reduce potential for equipment damage;
- Specified steps can/should be used as training material; therefore
- Improved hazard awareness;
- Improved workmanship; and
- Quality installations; therefore
- Improved safety;
- Less falls of ground occurrences;
- Improved production;
- Financial gain;
- Improved health and safety work environment and
- Improved workforce output.

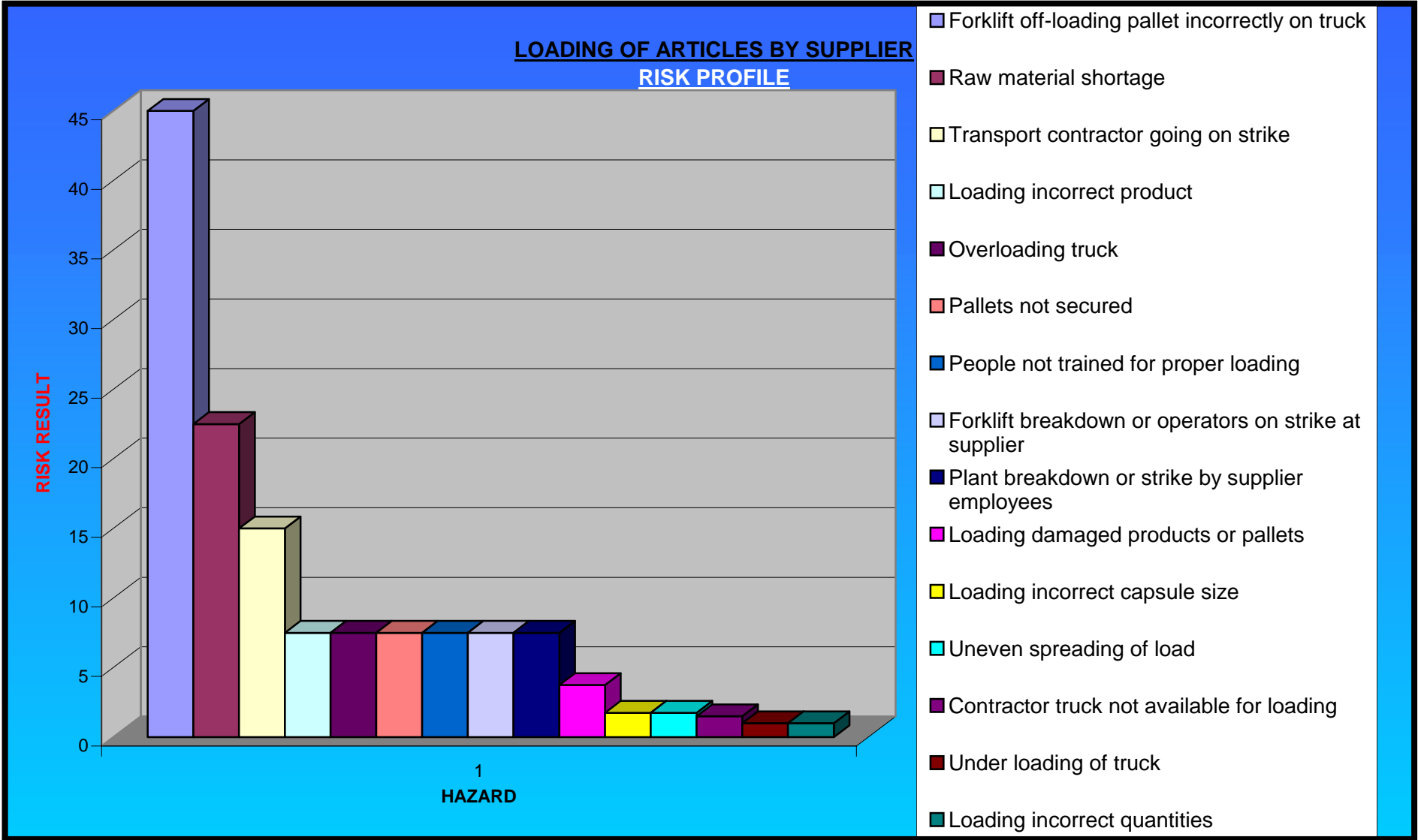
## **RISK ASSESSMENT DATABASE**

The following is incorporated in the risk assessment database of all the issues as described in the structure of the risk assessment explained under the scope of work:

- a. Risk profiles
- b. Hazard identification and risk measurement database
- c. Recommended safe working procedures/practices

## **A - LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY SUPPLIER**

**RISK PROFILE – LOADING OF ARTICLES BY SUPPLIER**



No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
1.	<b>Loading</b>	Loading incorrect product	Sub standard installation, personal injury, production loss, financial loss, down time, property damage	15	1	0.5	7.5	Loading controller ensures and over inspects load being loaded for despatch. If the user receives the incorrect product the supplier or area representative should be notified so that the correct action can be taken to prevent a re-occurrence. The supplier will supply the user with the correct product within 24 hours as far as reasonably practicable.
		Loading incorrect capsule size	Sub standard installation, personal injury, production loss, financial loss, down time, property damage	7	0.5	0.5	1.75	Loading controller ensures and over inspects the load being loaded for despatch and verifies load with picking slip used to draw stock from the store at the supplier. If the user observes the incorrect size capsules being delivered the supplier or area representative should be notified so that the correct action can be taken to prevent such an occurrence from taking place again.
		Overloading truck	Financial loss for supplier, vehicle damage, road damage, ignoring of road rules, lack of truck control	15	1	0.5	7.5	The supplier uses a weighbridge and picking slips to prevent the overloading of the truck. Driver will confirm if the truck is overloaded and will not move with truck if it is overloaded. If the user observes an overloaded truck the supplier to be contacted to ensure a re-occurrence to not take place.
		Under loading of truck	User running out of stock, sub standard conditions, personal injury, property damage, financial loss	1	1	1	1	Loading controller over inspects and ensures correct loading of truck. User to notify supplier if an under loaded truck is observed. The full load will be delivered at no additional costs to the user or credit will be forwarded for the next delivery.
		Uneven spreading of load	Road accidents, down time, loss of product, using inferior product, insurance claims, increased premiums	7	0.5	0.5	1.75	Loading controller and driver over inspects truck to ensure load is evenly spread. If the user observes an uneven load he should notify the supplier, or area representative who will assess the situation and act accordingly or advice the user alternatively.
		Transport contractor going on strike	Financial loss, shortage of product to client, sub standard installations, personal injury, down time, production loss	15	1	1	15	Supplier uses alternative transporters or use trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience.

No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
		Pallets not secured	Unstable load, falling load, road accidents, personal injury, financial loss, down time	15	1	0.5	7.5	Loading controller and driver ensures competent load before truck leaves premises. User to notify the supplier and area representative if any unsecured pallets are observed to ensure the correct action is taken to prevent a re-occurrence.
		Loading damaged products or pallets	Financial loss, loss of stocks, down time, using inferior products, sub standard installations, possible injury, possible production loss, possible property damage	15	0.5	0.5	3.75	Loading controller and driver over inspects load before the truck leaves the premises to ensure the load is in order for delivery. Should the user observe any damaged products or pallets the user should notify the supplier and area representative who will assess the situation and advise the user accordingly.
		Loading incorrect quantities	User running out of stock, sub standard conditions, personal injury, property damage, financial loss	1	1	1	1	Loading controller over inspects and ensures correct loading of truck. User to notify supplier if the incorrect quantity is delivered. The full load will be delivered at no additional costs to the user or credit will be forwarded for the next delivery.
		Forklift off-loading pallet incorrectly on truck	Damaged pallets or product, use of inferior products, sub standard installations, possible injury, possible property damage, financial loss	15	3	1	45	Loading controller and driver over inspects the loading of pallets onto the truck to reduce the possibility of the pallets being damaged during loading. Forklift drivers receive training in house with the supplier to ensure the products are correctly loaded.
		Contractor truck not available for loading	Financial loss, shortage of product to client, sub standard installations, personal injury, down time, production loss	3	1	0.5	1.5	Supplier uses alternative transporters or use trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience.

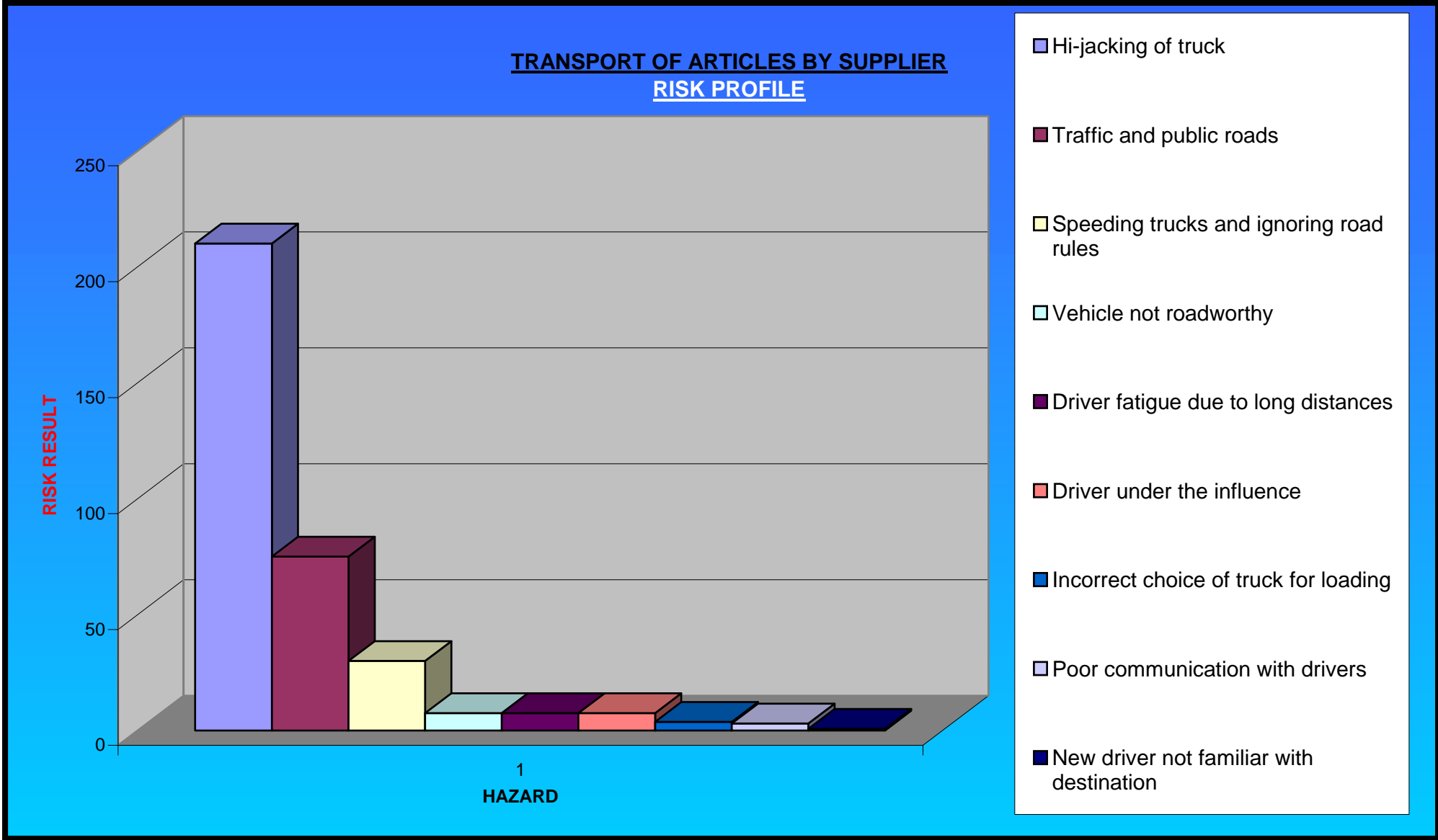
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
		People not trained for proper loading	Personal injury, incorrect loading of product, no stock, down time	15	0.5	1	7.5	The supplier runs an in house training programme, forklift drivers are trained and licensed and re-checked every second year. If the user observes any defects, as far as the product or loading there of is concerned, the supplier and area representative to be notified so that the necessary investigation can take place and relevant issue be resolved in due time.
		Forklift breakdown or operators on strike at supplier	Delay in loading, financial loss, loss of production, sub standard installation, possible injury	15	1	0.5	7.5	Supplier has a service agreement in place with forklift supplier, regular maintenance is conducted on forklifts. On site a total of four forklifts are operating. Supplier has sound working relationship with employees and in the past twenty five years only one strike were recorded but no client were affected.
		Plant breakdown or strike by supplier employees	Delay in loading, financial loss, loss of production, sub standard installation, possible injury	15	1	0.5	7.5	Supplier has sound maintenance program in place, and uses alternative production lines to ensure continuous manufacturing of products. Supplier has sound working relationship with employees and in the past twenty five years only one strike were recorded but no client were affected.
		Raw material shortage	Delay in production, delay in loading, financial loss, loss of production, sub standard installation, possible injury	15	3	0.5	22.5	Supplier ensures minimum stock levels are maintained. Supplier has alternative raw material suppliers.

**RECOMMENDED SAFE WORKING PRACTICE FOR LOADING OF ARTICLES BY SUPPLIER**

<b>Activity</b>	<b>Potential Hazard</b>	<b>Recommendation/Controls</b>
<b>Loading</b>	Loading incorrect product	Loading controller ensures and over inspects load being loaded for dispatch. If the user receives the incorrect product the supplier or area representative should be notified so that the correct action can be taken to prevent a re-occurrence. The supplier will supply the user with the correct product within 24 hours as far as reasonably practicable.
	Loading incorrect capsule size	Loading controller ensures and over inspects the load being loaded for dispatch and verifies load with picking slip used to draw stock from the store at the supplier. If the user observes the incorrect size capsules being delivered the supplier or area representative should be notified so that the correct action can be taken to prevent such an occurrence from taking place again.
	Overloading truck	The supplier uses a weighbridge and picking slips to prevent the overloading of the truck. Driver will confirm if the truck is overloaded and will not move with truck if it is overloaded. If the user observes an overloaded truck the supplier to be contacted to ensure a re-occurrence to not take place.
	Under loading of truck	Loading controller over inspects and ensures correct loading of truck. User to notify supplier if an under loaded truck is observed. The full load will be delivered at no additional costs to the user or credit will be forwarded for the next delivery.
	Uneven spreading of load	Loading controller and driver over inspects truck to ensure load is evenly spread. If the user observes an uneven load he should notify the supplier, or area representative who will assess the situation and act accordingly or advice the user alternatively.
	Transport contractor going on strike	Supplier uses alternative transporters or use trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience.
	Pallets not secured	Loading controller and driver ensures competent load before truck leaves premises. User to notify the supplier and area representative if any unsecured pallets are observed to ensure the correct action is taken to prevent a re-occurrence.
	Loading damaged products or pallets	Loading controller and driver over inspects load before the truck leaves the premises to ensure the load is in order for delivery. Should the user observe any damaged products or pallets the user should notify the supplier and area representative who will assess the situation and advise the user accordingly.

<b>Activity</b>	<b>Potential Hazard</b>	<b>Recommendation/Controls</b>
	Loading incorrect quantities	Loading controller over inspects and ensures correct loading of truck. User to notify supplier if the incorrect quantity is delivered. The full load will be delivered at no additional costs to the user or credit will be forwarded for the next delivery.
	Forklift off-loading pallet incorrectly on truck	Loading controller and driver over inspects the loading of pallets onto the truck to reduce the possibility of the pallets being damaged during loading. Forklift drivers receive training in house with the supplier to ensure the products are correctly loaded.
	Contractor truck not available for loading	Supplier uses alternative transporters or use trucks hired by them to ensure deliveries reach users on time. Supplier will notify the user of any business interruptions at the supplier's earliest convenience.
	People not trained for proper loading	The supplier runs an in house training programme, forklift drivers are trained and licensed and re-checked every second year. If the user observes any defects, as far as the product or loading there of is concerned, the supplier and area representative to be notified so that the necessary investigation can take place and relevant issue be resolved in due time.
	Forklift breakdown or operators on strike at supplier	Supplier has a service agreement in place with forklift supplier, regular maintenance is conducted on forklifts. On site a total of four forklifts are operating. Supplier has sound working relationship with employees and in the past twenty five years only one strike were recorded but no client were affected.
	Plant breakdown or strike by supplier employees	Supplier has sound maintenance program in place, and uses alternative production lines to ensure continuous manufacturing of products. Supplier has sound working relationship with employees and in the past twenty five years only one strike were recorded but no client were affected.
	Raw material shortage	Supplier ensures minimum stock levels are maintained. Supplier has alternative raw material suppliers.

RISK PROFILE – TRANSPORTING OF ARTICLES BY SUPPLIER



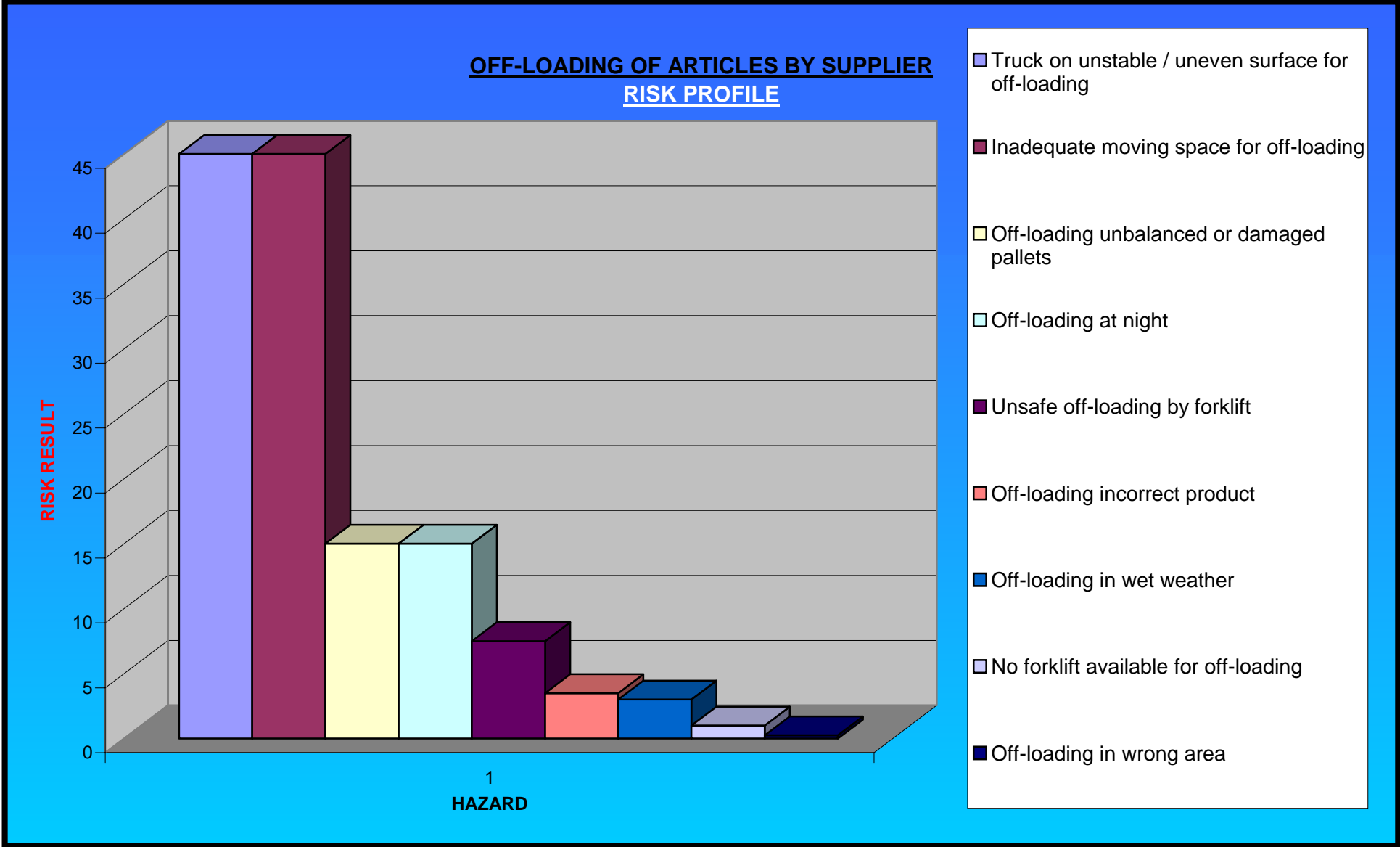
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
2.	<b>Transport</b>	Vehicle not roadworthy	Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	15	1	0.5	7.5	Supplier uses reputable transporters and uses alternative s if necessary. Track history proofs that trucks used are road worthy and in good condition for transport.
		Driver fatigue due to long distances	Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	15	1	0.5	7.5	Track history has proven that drivers are cautious and no fatigue is taking place.
		Driver under the influence	Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	15	1	0.5	7.5	Track history has proven that the transport contractor is of reputable source.
		Hi-jacking of truck	Loss of load, financial loss, shortage of stock, production loss, possible injury, sub standard installation	7	10	3	210	Trucks equipped with satellite tracking, drivers equipped with communication systems, supplier can have hi-jacked load on the road to user in a matter of a few hours.
		New driver not familiar with destination	Delay in delivery, shortage of stock on mine	3	0.5	0.5	0.75	Communication systems are used and drivers are in possession of maps for specific destinations.
		Incorrect choice of truck for loading	Short loads, delay, overloads, financial loss, short or over supply on order	15	0.5	0.5	3.75	Pre-load planning is done on a daily basis and the correct size of truck is arranged for loading.

No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
		Traffic and public roads	Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	15	10	0.5	75	Supplier uses a reputable transport contractor and track history is proof of sound driving experience.
		Poor communication with drivers	Delay in delivery, shortage of stock on mine	3	1	1	3	Communication systems are fitted in the truck, which gives direct communication with drivers, and contractor attends supplier meetings where relevant issues are discussed and resolved.
		Speeding trucks and ignoring road rules	Road accidents, personal injury, product damage, delay in delivery, shortage of product on mine, sub standard installation, production loss, financial loss	15	2	1	30	Trucks are governed by national speed limits, track history is proof of transport contractors sound operations as far as speeding and road rules are concerned.

## RECOMMENDED SAFE WORKING PRACTICE FOR TRANSPORTING OF ARTICLES BY SUPPLIER

Activity	Potential Hazard	Recommendation/Controls
<b>Transport</b>	Vehicle not roadworthy	Supplier uses reputable transporters and uses alternative s if necessary. Track history proofs that trucks used are road worthy and in good condition for transport.
	Driver fatigue due to long distances	Track history has proven that drivers are cautious and no fatigue is taking place.
	Driver under the influence	Track history has proven that the transport contractor is of reputable source.
	Hi-jacking of truck	Trucks equipped with satellite tracking, drivers equipped with communication systems, supplier can have hi-jacked load on the road to user in a matter of a few hours.
	New driver not familiar with destination	Communication systems are used and drivers are in possession of maps for specific destinations.
	Incorrect choice of truck for loading	Pre-load planning is done on a daily basis and the correct size of truck is arranged for loading.
	Traffic and public roads	Supplier uses a reputable transport contractor and track history is proof of sound driving experience.
	Poor communication with drivers	Communication systems are fitted in the truck, which gives direct communication with drivers, and contractor attends supplier meetings where relevant issues are discussed and resolved.
	Speeding trucks and ignoring road rules	Trucks are governed by national speed limits, track history is proof of transport contractors sound operations as far as speeding and road rules are concerned.

RISK PROFILE – OFF-LOADING OF ARTICLES BY SUPPLIER



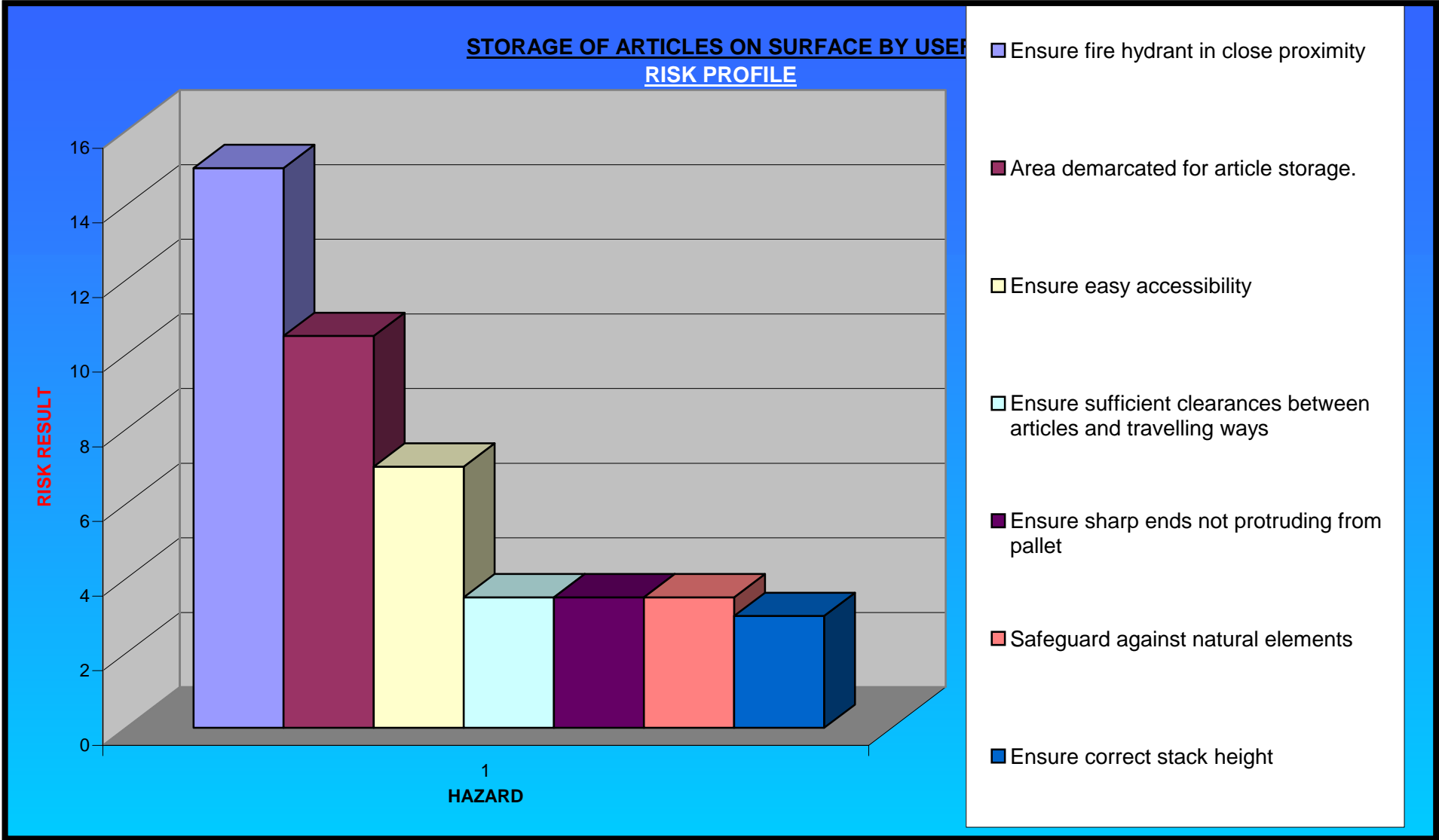
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
3.	<b>Off-loading</b>	Truck on unstable / uneven surface for off-loading	Personal injury, product damage	15	1	3	45	User to ensure that a demarcated even area is available for off-loading to ensure safe off-loading of product.
		Inadequate moving space for off-loading	Personal injury, property damage, product damage, delay	15	1	3	45	User to ensure that adequate space for off-loading is available for trucks to enter and exit without any restriction.
		Unsafe off-loading by forklift	Personal injury, property damage, product damage, delay	15	1	0.5	7.5	User to ensure that only a competent forklift driver is used for off-loading pallets, due to the weight of the pallets, ranging up to a ton requires a competent person for off-loading.
		Off-loading unbalanced or damaged pallets	Personal injury, property damage, product damage, delay	15	1	1	15	Pallets are inspected before leaving the supplier to ensure pallets are in tact, should a pallet be damaged or unbalanced on arrival at the user the user should off-load pallet with at most care, if pallet is badly damaged, bags should be removed or off-loaded manually onto a stable pallet for off-loading by a forklift.
		Off-loading in wrong area	Delay	1	0.5	0.5	0.25	Supplier issues driver with a delivery note, which is verified by the client for correct delivery.
		No forklift available for off-loading	Delay	2	0.5	1	1	At all cost the user to ensure that a forklift is available for off-loading to prevent pallets being stripped to enable manual off-loading which increases the chance of personal injury.
		Off-loading in wet weather	Loss of product, personal injury, inferior product going underground, financial loss	1	1	3	3	If off-loading has to be done in wet weather the user to ensure a covered area is available for off-loading or alternatively wait until rain has stopped and then off-load, pallets are rapped and covered with a u/v stabilised shroud and shrink rapping to minimise the effect of natural elements on the product which may cause it to become inferior.
		Off-loading at night	Product damage, personal injury, property damage	15	2	0.5	15	If off-loading has to take place the user to ensure the area for off-loading is well illuminated to prevent any damage or injury-taking place due to poor visibility.
		Off-loading incorrect product	Delay, financial loss, run out of stock	7	1	0.5	3.5	Supplier uses a delivery note by which the user confirms correct product for delivery, should the incorrect product be delivered the user to notify the supplier and the supplier will deliver correct product within 24 hours.

## RECOMMENDED SAFE WORKING PRACTICE FOR OFF-LOADING OF ARTICLES BY SUPPLIER

Activity	Potential Hazard	Recommendation/Controls
<b>Off-loading</b>	Truck on unstable / uneven surface for off-loading	User to ensure that a demarcated even area is available for off-loading to ensure safe off-loading of product.
	Inadequate moving space for off-loading	User to ensure that adequate space for off-loading is available for trucks to enter and exit without any restriction.
	Unsafe off-loading by forklift	User to ensure that only a competent forklift driver is used for off-loading pallets, due to the weight of the pallets, ranging up to a ton requires a competent person for off-loading.
	Off-loading unbalanced or damaged pallets	Pallets are inspected before leaving the supplier to ensure pallets are in tact, should a pallet be damaged or unbalanced on arrival at the user the user should off-load pallet with at most care, if pallet is badly damaged, bags should be removed or off-loaded manually onto a stable pallet for off-loading by a forklift.
	Off-loading in wrong area	Supplier issues driver with a delivery note, which is verified by the client for correct delivery.
	No forklift available for off-loading	At all cost the user to ensure that a forklift is available for off-loading to prevent pallets being stripped to enable manual off-loading which increases the chance of personal injury.
	Off-loading in wet weather	If off-loading has to be done in wet weather the user to ensure a covered area is available for off-loading or alternatively wait until rain has stopped and then off-load, pallets are rapped and covered with a u/v stabilized shroud and shrink rapping to minimize the effect of natural elements on the product which may cause it to become inferior.
	Off-loading at night	If off-loading has to take place the user to ensure the area for off-loading is well illuminated to prevent any damage or injury-taking place due to poor visibility.
	Off-loading incorrect product	Supplier uses a delivery note by which the user confirms correct product for delivery, should the incorrect product be delivered the user to notify the supplier and the supplier will deliver correct product within 24 hours.

**B - STORAGE OF ARTICLES ON SURFACE BY USER:**

RISK PROFILE - STORAGE OF ARTICLES BY SUPPLIER



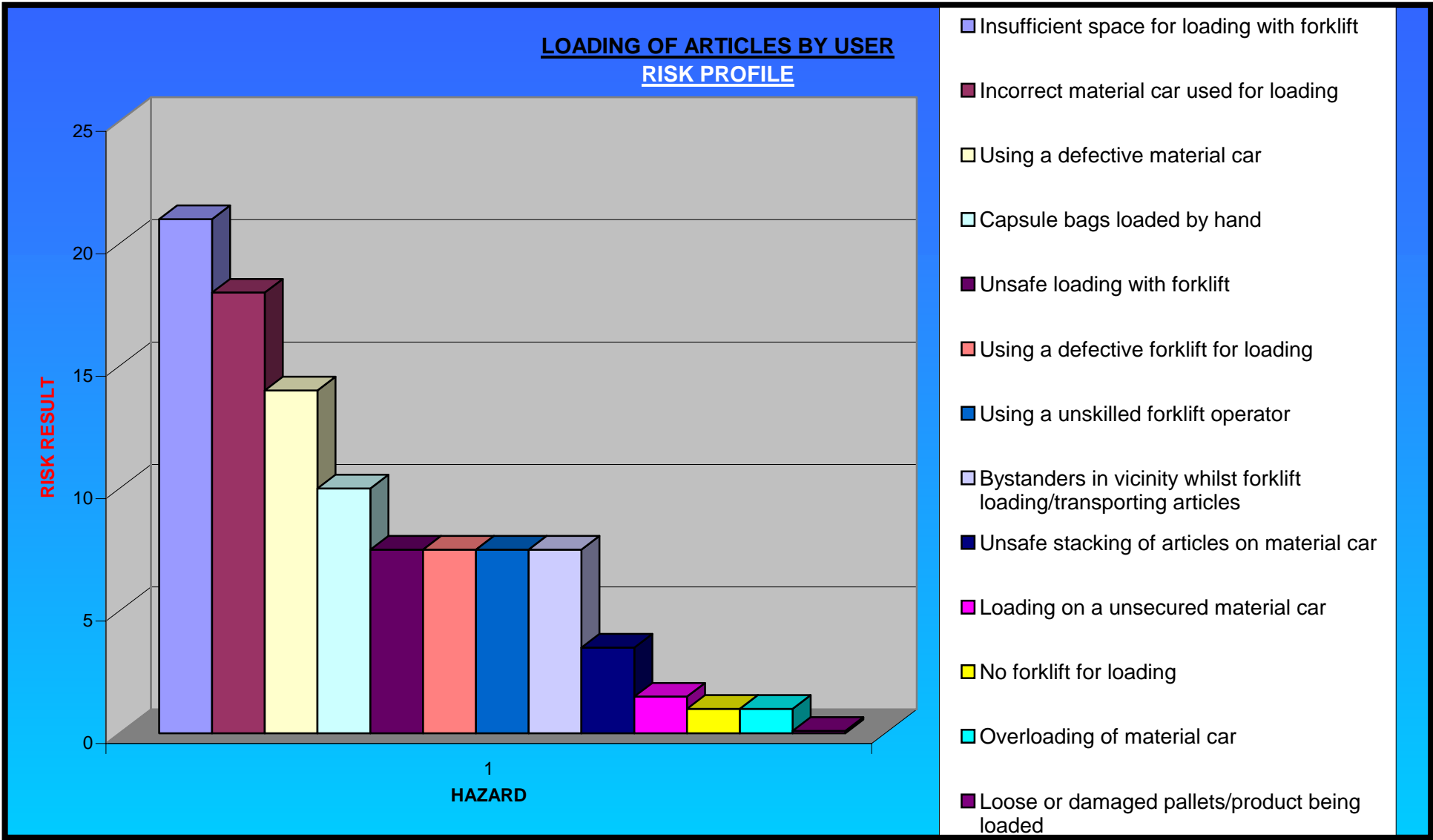
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
1.	<b>Area demarcated for article storage.</b>	Area not demarcated, wrong product being issued, difficult loading, potential fire hazard if area is next to electrical installations for example	Property damage, time delay	7	3	0.5	10.5	Products are supplied in maximum one-ton pallets, which requires a forklift for off-loading and storing pallets, therefore the user to ensure that a specific area is demarcated for the purpose of storing and transporting pallets by forklift with sufficient clearances to prevent any possible damage and injury to person. Preferably the demarcated area should be cool and dry.
2.	<b>Ensure correct stack height</b>	Stacking to high, falling stacks,	Injury to person, product damage, financial loss	15	2	0.1	3	If space allows, the ideal situation is not to stack pallets on top of each other, should pallets be stacked it is recommended that only a maximum of one pallet be stacked on top to reduce the possibility of falling pallets.
3.	<b>Ensure sufficient clearances between articles and travelling ways</b>	Inadequate clearances, obstructed travelling ways, obstructed escape routes, trip and fall	Possible injury, property damage	7	1	0.5	3.5	User to ensure that sufficient clearances are maintained at all times. As far as reasonably practicable pallets must not be stored in travelling or escape routes or near electrical installations which may pose a fire hazard due to the shrouds, shrink plastic and pallet it self.
4.	<b>Ensure sharp ends not protruding from pallet</b>	Broken pallets, sharp edges, obstructed travelling ways, slip and trip	Personal injury, property damage, falling stack	7	1	0.5	3.5	User to remove any broken pallets with protruding sharp edges to prevent the possibility of injury or damage.
5.	<b>Ensure easy accessibility</b>	Inadequate access, difficult loading and off-loading	Personal injury, product damage and property damage	7	2	0.5	7	The user to ensure that storing area is easy accessible for loading and off-loading using a forklift to prevent any possible injury or property damage.
6.	<b>Safeguard against natural elements</b>	Rain, sun, poor visibility at night, blind spots and corners	Damage to product, possible injury or property damage	7	1	0.5	3.5	As far as reasonably practicable the user to avoid storage in direct sunlight, storage must be in dry conditions preferably under cover with area well illuminated and no blind spots or corners which may lead to poor visibility and possible injury and damage.
7.	<b>Ensure fire hydrant in close proximity</b>	Shrouds, shrink rapping and pallet poses fire hazard	Fire, damage to product, property damage, possible injury	15	10	0.1	15	Once capsules are removed from the pallet, the shrouds, shrinking plastic and pallet to be disposed of as soon as possible in a container allocated for this purpose to reduce the exposure to the fire hazards.

## RECOMMENDED SAFE WORKING PRACTICE FOR STORAGE OF ARTICLES ON SURFACE BY USER

Activity	Potential Hazard	Recommendation/Controls
<b>Area demarcated for article storage.</b>	Area not demarcated, wrong product being issued, difficult loading, potential fire hazard if area is next to electrical installations for example	Products are supplied in maximum one-ton pallets, which requires a forklift for off-loading and storing pallets, therefore the user to ensure that a specific area is demarcated for the purpose of storing and transporting pallets by forklift with sufficient clearances to prevent any possible damage and injury to person. Preferably the demarcated area should be cool and dry.
<b>Ensure correct stack height</b>	Stacking to high, falling stacks,	If space allows, the ideal situation is not to stack pallets on top of each other, should pallets be stacked it is recommended that only a maximum of one pallet be stacked on top to reduce the possibility of falling pallets.
<b>Ensure sufficient clearances between articles and traveling ways</b>	Inadequate clearances, obstructed traveling ways, obstructed escape routes, trip and fall	User to ensure that sufficient clearances are maintained at all times. As far as reasonably practicable pallets must not be stored in traveling or escape routes or near electrical installations which may pose a fire hazard due to the shrouds, shrink plastic and pallet it self.
<b>Ensure sharp ends not protruding from pallet</b>	Broken pallets, sharp edges, obstructed traveling ways, slip and trip	User to remove any broken pallets with protruding sharp edges to prevent the possibility of injury or damage.
<b>Ensure easy accessibility</b>	Inadequate access, difficult loading and off-loading	The user to ensure that storing area is easy accessible for loading and off-loading using a forklift to prevent any possible injury or property damage.
<b>Safeguard against natural elements</b>	Rain, sun, poor visibility at night, blind spots and corners	As far as reasonably practicable the user to avoid storage in direct sunlight, storage must be in dry conditions preferably under cover with area well illuminated and no blind spots or corners which may lead to poor visibility and possible injury and damage.
<b>Ensure fire hydrant in close proximity</b>	Shrouds, shrink rapping and pallet poses fire hazard	Once capsules are removed from the pallet, the shrouds, shrinking plastic and pallet to be disposed of as soon as possible in a container allocated for this purpose to reduce the exposure to the fire hazards.

**C - LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY USER:**

RISK PROFILE - LOADING OF ARTICLES BY USER



No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
1.	<b>Loading</b>	No forklift for loading	Delay, handling bags by hand	1	1	1	1	The user must as far as reasonably practicable use a forklift for loading articles and prevent loading by hand as far as possible to reduce any possibility of injury or over exertion by workers. Should manual loading take place the user then to ensure that employees performing the task use the correct PPE such as gloves, goggles, rubber boots and dust masks.
		Unsafe loading with forklift	Property damage, product damage, possible injury	15	1	0.5	7.5	User to ensure that a competent forklift operator is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
		Using a defective forklift for loading	Property damage, product damage, possible injury	15	1	0.5	7.5	User to ensure that a well maintained forklift, which is in order, is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
		Insufficient space for loading with forklift	Property damage, product damage, possible injury	7	3	1	21	User to ensure sufficient demarcated areas and required space for loading and off-loading articles with a forklift to reduce the possibility of injury or damage.
		Using a unskilled forklift operator	Property damage, product damage, possible injury	15	1	0.5	7.5	User to ensure that a competent forklift operator is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
		Bystanders in vicinity whilst forklift loading/transporting articles	Property damage, product damage, possible injury	15	1	0.5	7.5	User to ensure that personnel not related to task being performed to be well cleared from area when forklift is loading pallets, to reduce the possibility of injury or damage.
		Unsafe stacking of articles on material car	Property damage, product damage, possible injury	7	1	0.5	3.5	Users to load capsule bags in a proper material car allocated for this purpose and not load on flat cars to prevent any unsafe loading, when using a material car with closed sides the car not to be overloaded to prevent falling bags and subsequent damage to the product.



No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
		Loose or damaged pallets/product being loaded	Property damage, product damage, possible injury	1	1	0.1	0.1	Avoid loading any material that is damaged or broken, which may be used on installation and result in a sub standard installation, which may have serious consequences.
		Loading on a unsecured material car	Property damage, product damage, possible injury	3	1	0.5	1.5	User to ensure material car is properly secured for loading to prevent a run away car that may cause personal injury or damage to the product or property.
		Overloading of material car	Property damage, product damage, possible injury	1	2	0.5	1	User not to load in excess of the rim of material car to avoid bags protruding from the top of the car, which may cause bags falling of car during transit, which may cause product damage or injury.
		Incorrect material car used for loading	Property damage, product damage, possible injury	3	6	1	18	As far as reasonably practicable the user only to use proper enclosed material cars for the transport of the articles to reduce the possibility of falling bags during transit if a flat car were to be used.
		Using a defective material car	Property damage, product damage, possible injury	7	2	1	14	User to ensure material car is in order with no defects for transport of articles, a defective car may cause derailments which may result in down time or injury and damage to the product.
		Capsule bags loaded by hand	Product damage, personal injury, health problems	1	10	1	10	Supplier manufactures bag with a handle grip to facilitate easier handling of the bags, which has a weight of 7-8kg's. Do not handle more than two bags at any one time to reduce the possibility of injury. Continuous contact may lead to health problems therefore employees working with the articles should be screened at annual medical checks for any specific health problems caused by long term skin contact. Employees handling articles must be equipped with PVC gloves, dust masks, rubber boots and goggles to reduce the possibility of health problems. Should an employee have direct contact with the substance on the skin, in the eye or mouth the substance to be removed with the use of plenty clean water.

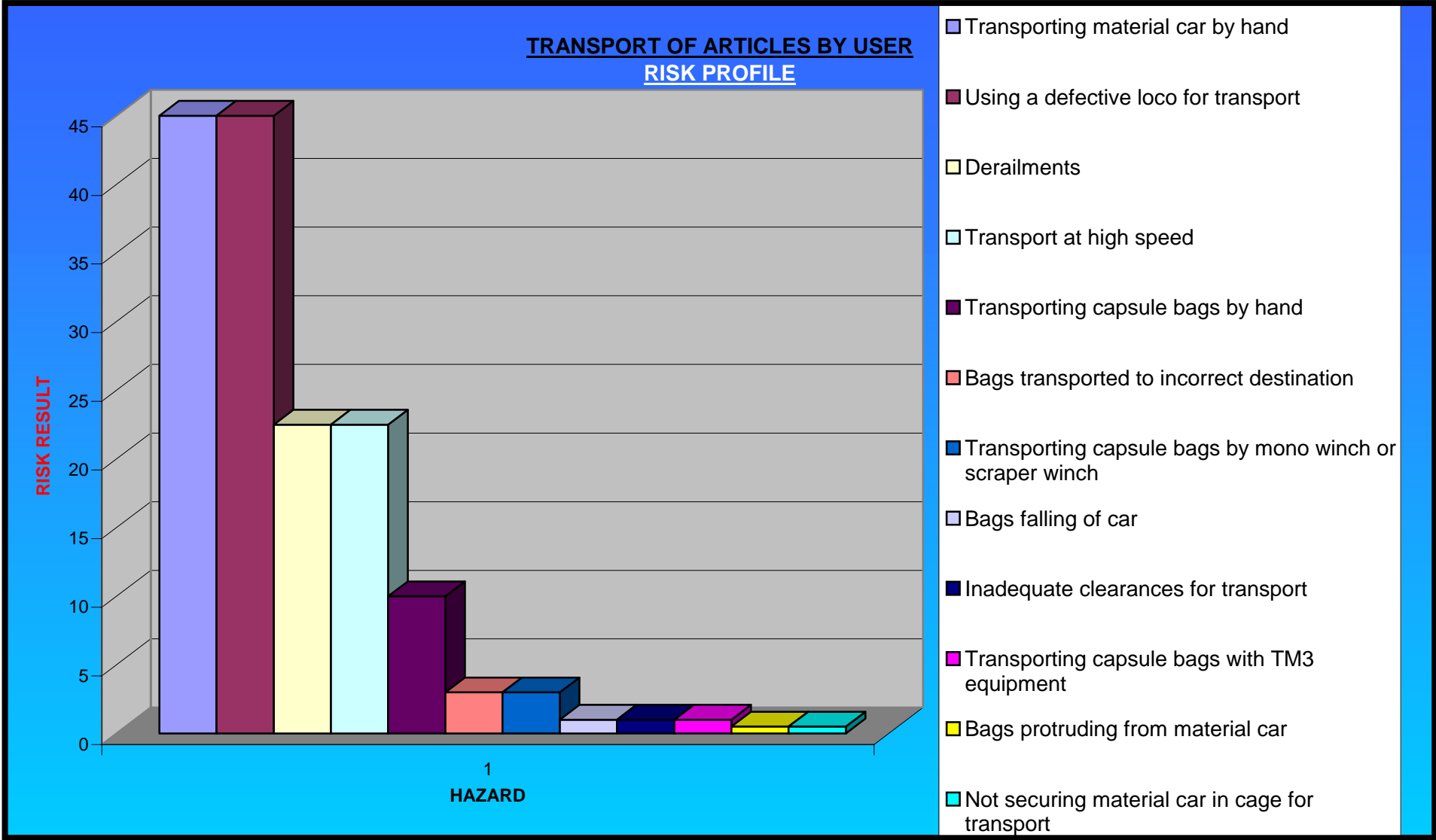
## RECOMMENDED SAFE WORKING PRACTICE FOR LOADING, TRANSPORT AND OFF-LOADING OF ARTICLES BY USER

Activity	Potential Hazard	Recommendation/Controls
<b>Loading</b>	No forklift for loading	The user must as far as reasonably practicable use a forklift for loading articles and prevent loading by hand as far as possible to reduce any possibility of injury or over exertion by workers. Should manual loading take place the user then to ensure that employees performing the task use the correct PPE such as gloves, goggles, rubber boots and dust masks.
	Unsafe loading with forklift	User to ensure that a competent forklift operator is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
	Using a defective forklift for loading	User to ensure that a well maintained forklift, which is in order, is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
	Insufficient space for loading with forklift	User to ensure sufficient demarcated areas and required space for loading and off-loading articles with a forklift to reduce the possibility of injury or damage.
	Using a unskilled forklift operator	User to ensure that a competent forklift operator is used for loading the pallets due to the size of the pallets, to reduce the possibility of injury or damage.
	Bystanders in vicinity whilst forklift loading/transporting articles	User to ensure that personnel not related to task being performed to be well cleared from area when forklift is loading pallets, to reduce the possibility of injury or damage.
	Unsafe stacking of articles on material car	Users to load capsule bags in a proper material car allocated for this purpose and not load on flat cars to prevent any unsafe loading, when using a material car with closed sides the car not to be overloaded to prevent falling bags and subsequent damage to the product.
	Loose or damaged pallets/product being loaded	Avoid loading any material that is damaged or broken, which may be used on installation and result in a sub standard installation, which may have serious consequences.

<b>Activity</b>	<b>Potential Hazard</b>	<b>Recommendation/Controls</b>
	Loading on a unsecured material car	User to ensure material car is properly secured for loading to prevent a run away car that may cause personal injury or damage to the product or property.
	Overloading of material car	User not to load in excess of the rim of material car to avoid bags protruding from the top of the car, which may cause bags falling of car during transit, which may cause product damage or injury.
	Incorrect material car used for loading	As far as reasonably practicable the user only to use proper enclosed material cars for the transport of the articles to reduce the possibility of falling bags during transit if a flat car were to be used.
	Using a defective material car	User to ensure material car is in order with no defects for transport of articles, a defective car may cause derailments which may result in down time or injury and damage to the product.
	Capsule bags loaded by hand	Supplier manufactures bag with a handle grip to facilitate easier handling of the bags, which has a weight of 7-8kg's. Do not handle more than two bags at any one time to reduce the possibility of injury. Continuous contact may lead to health problems therefore employees working with the articles should be screened at annual medical checks for any specific health problems caused by long term skin contact. Employees handling articles must be equipped with PVC gloves, dust masks, rubber boots and goggles to reduce the possibility of health problems. Should an employee have direct contact with the substance on the skin, in the eye or mouth the substance to be removed with the use of plenty clean water.

### RISK PROFILE - TRANSPORTING OF ARTICLES BY USER

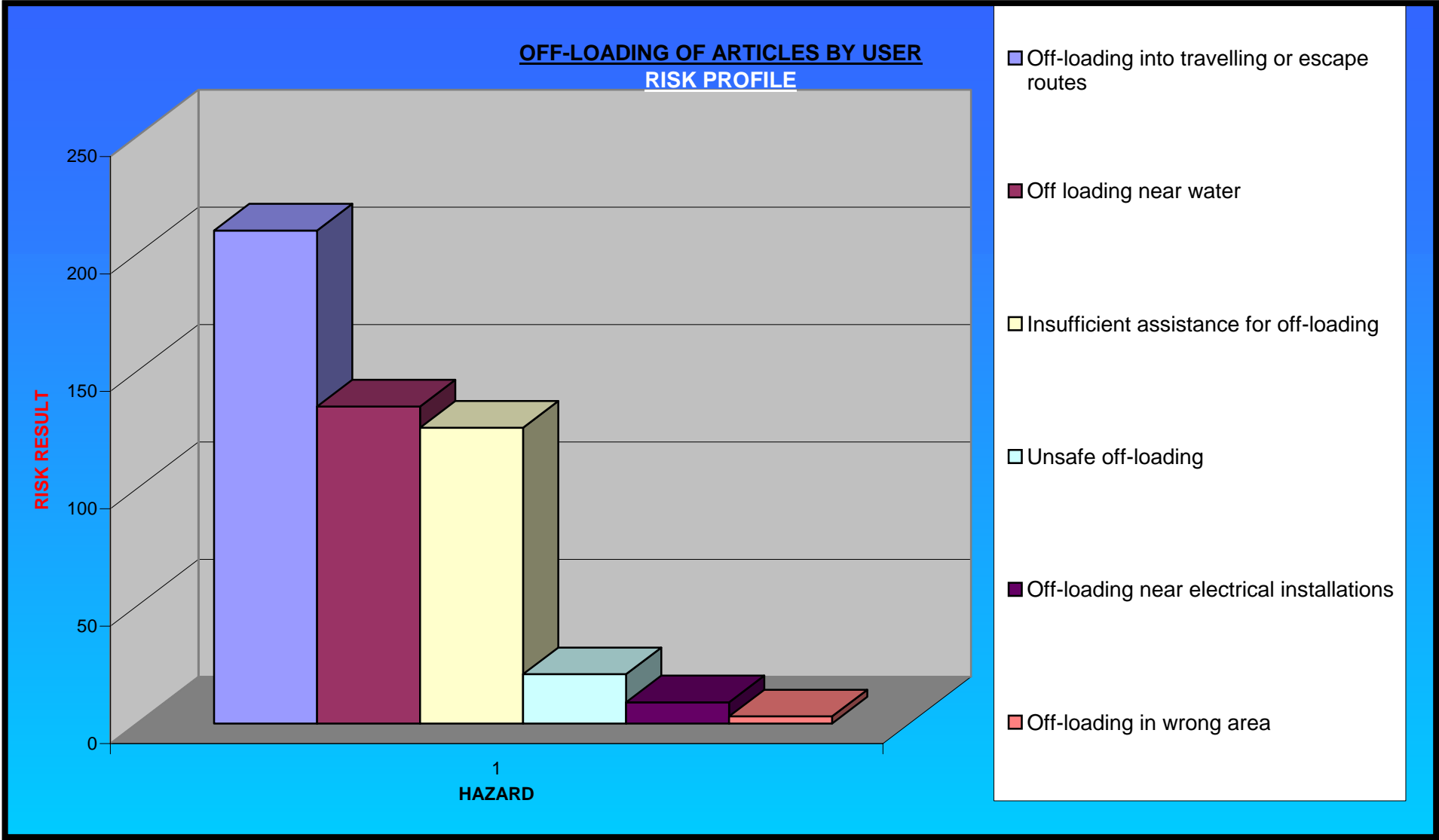
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
2.	<b>Transport</b>	Derailments	Property damage, product damage, personal injury	15	3	0.5	22.5	User to ensure that a well maintained material car is used for transport to reduce the possibility of any derailments.
		Bags falling of car	Product loss	1	1	1	1	User not to load in excess of the rim of material car
		Transport at high speed	Property damage, product damage, personal injury	15	3	0.5	22.5	User not to overload material cars and keep to underground speed limits.
		Bags protruding from material car	Loss of product	1	1	0.5	0.5	User not to load in excess of the rim of material car
		Bags transported to incorrect destination	Time delay	1	3	1	3	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support tem.
		Inadequate clearances for transport	Product loss	1	1	1	1	User not to load in excess of the rim of material car
		Transporting material car by hand	Product loss, time delay, personal injury, property damage	15	6	0.5	45	User not transport material using flat cars pushed by hand, but rather enclosed material cars using a locomotive to reduce the possibility of injury and damage.
		Using a defective loco for transport	Product loss, time delay, personal injury, property damage	15	1	3	45	If the user uses a defective loco for transport the weight of the articles could result in substantial momentum created therefore it is essential that no defective loco be used.
		Not securing material car in cage for transport	Product loss, time delay, personal injury, property damage	1	1	0.5	0.5	User not to load in excess of the rim of material car, and ensure car is secured in cage.
		Transporting capsule bags by hand	Product damage, personal injury	1	10	1	10	Supplier manufactures bag with a handle grip to facilitate easier handling of the bags, which has a weight of 7-8kg's. Do not handle more than two bags at any one time to reduce the possibility of injury.
		Transporting capsule bags by mono winch or scraper winch	Loss of product	1	6	0.5	3	User to secure article properly for transport and ensure a designated area for off-loading to minimise damage to the product
		Transporting capsule bags with TM3 equipment	Overloading of equipment, loss of product, falling products	1	10	0.1	1	User not to overload equipment when transporting articles and only designated equipment for transport should be used.



## RECOMMENDED SAFE WORKING PRACTICE FOR TRANSPORTING OF ARTICLES BY USER

Activity	Potential Hazard	Recommendation/Controls
<b>Transport</b>	Derailments	User to ensure that a well maintained material car is used for transport to reduce the possibility of any derailments.
	Bags falling of car	User not to load in excess of the rim of material car
	Transport at high speed	User not to overload material cars and keep to underground speed limits.
	Bags protruding from material car	User not to load in excess of the rim of material car
	Bags transported to incorrect destination	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support tem.
	Inadequate clearances for transport	User not to load in excess of the rim of material car
	Transporting material car by hand	User not transport material using flat cars pushed by hand, but rather enclosed material cars using a locomotive to reduce the possibility of injury and damage.
	Using a defective loco for transport	If the user uses a defective loco for transport the weight of the articles could result in substantial momentum created therefore it is essential that no defective loco be used.
	Not securing material car in cage for transport	User not to load in excess of the rim of material car, and ensure car is secured in cage.
	Transporting capsule bags by hand	Supplier manufactures bag with a handle grip to facilitate easier handling of the bags, which has a weight of 7-8kg's. Do not handle more than two bags at any one time to reduce the possibility of injury.
	Transporting capsule bags by mono winch or scraper winch	User to secure article properly for transport and ensure a designated area for off-loading to minimize damage to the product
	Transporting capsule bags with TM3 equipment	User not to overload equipment when transporting articles and only designated equipment for transport should be used.

RISK PROFILE – OFF-LOADING OF ARTICLES BY USER



No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
3.	<b>Off-loading</b>	Unsafe off-loading	Product loss, personal injury	7	6	0.5	21	Off loading to be done in designated areas and at all times the employees to take caution to not stand on top of the material car for off-loading.
		Off-loading in wrong area	Time delay	1	3	1	3	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support tem.
		Off-loading into travelling or escape routes	Obstructed travelling and escape routes, personal injury	7	10	3	210	User only to unload in designated areas
		Off-loading near electrical installations	Possible fir hazard, possible restriction of ventilation flow	3	6	0.5	9	Off load in designated area and avoid electrical installations due to bags poses a fire risk.
		Off loading near water	Damage to product, sub standard installation, loss of product, financial loss	15	3	3	135	Bags are manufactured with water proof inner liners inside main bag, still user to take care not to store product near or in water
		Insufficient assistance for off-loading	Time delay, product damage, financial loss, sub standard installations	7	6	3	126	Always ensure sufficient assistance for off-loading to reduce the possibility of damage to the bags

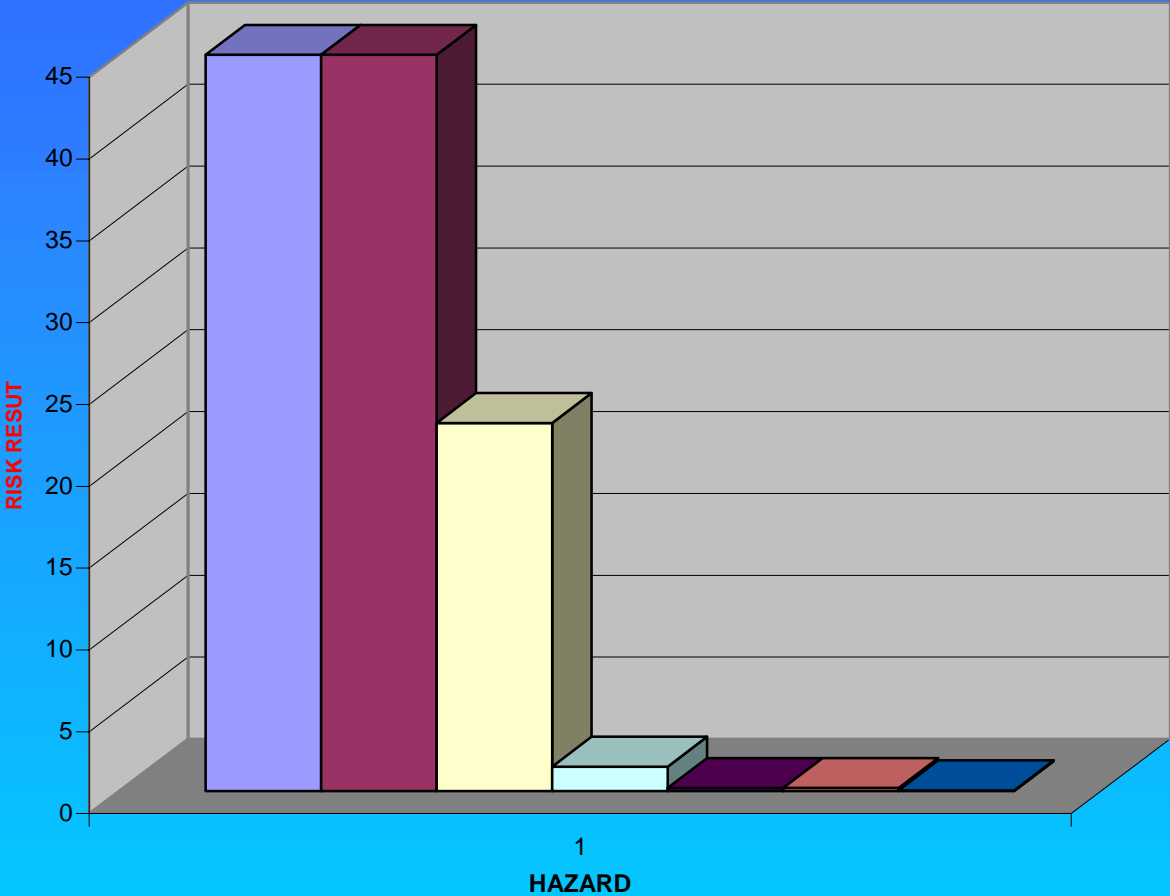
## RECOMMENDED SAFE WORKING PRACTICE FOR OFF-LOADING OF ARTICLES BY USER

Activity	Potential Hazard	Recommendation/Controls
<b>Off-loading</b>	Unsafe off-loading	Off loading to be done in designated areas and at all times the employees to take caution to not stand on top of the material car for off-loading.
	Off-loading in wrong area	User to clearly demarcate material cars for designated areas to prevent incorrect off-loading in wrong area, due to the fact that the item is classified as a critical support tem.
	Off-loading into traveling or escape routes	User only to unload in designated areas
	Off-loading near electrical installations	Off load in designated area and avoid electrical installations due to bags poses a fire risk.
	Off loading near water	Bags are manufactured with water proof inner liners inside main bag, still user to take care not to store product near or in water
	Insufficient assistance for off-loading	Always ensure sufficient assistance for off-loading to reduce the possibility of damage to the bags

## **D - STORAGE OF ARTICLES UNDERGROUND BY USER:**

RISK PROFILE – STORAGE OF ARTICLES BY USER

**STORAGE OF ARTICLES UNDERGROUND BY USER**  
**RISK PROFILE**



- Ensure a safe area for storage purposes
- Area demarcated for article storage.
- Safeguard against natural elements
- Ensure correct stack height
- Ensure sufficient clearances between articles and travelling ways
- Ensure easy accessibility
- Ensure fire extinguisher in close proximity.

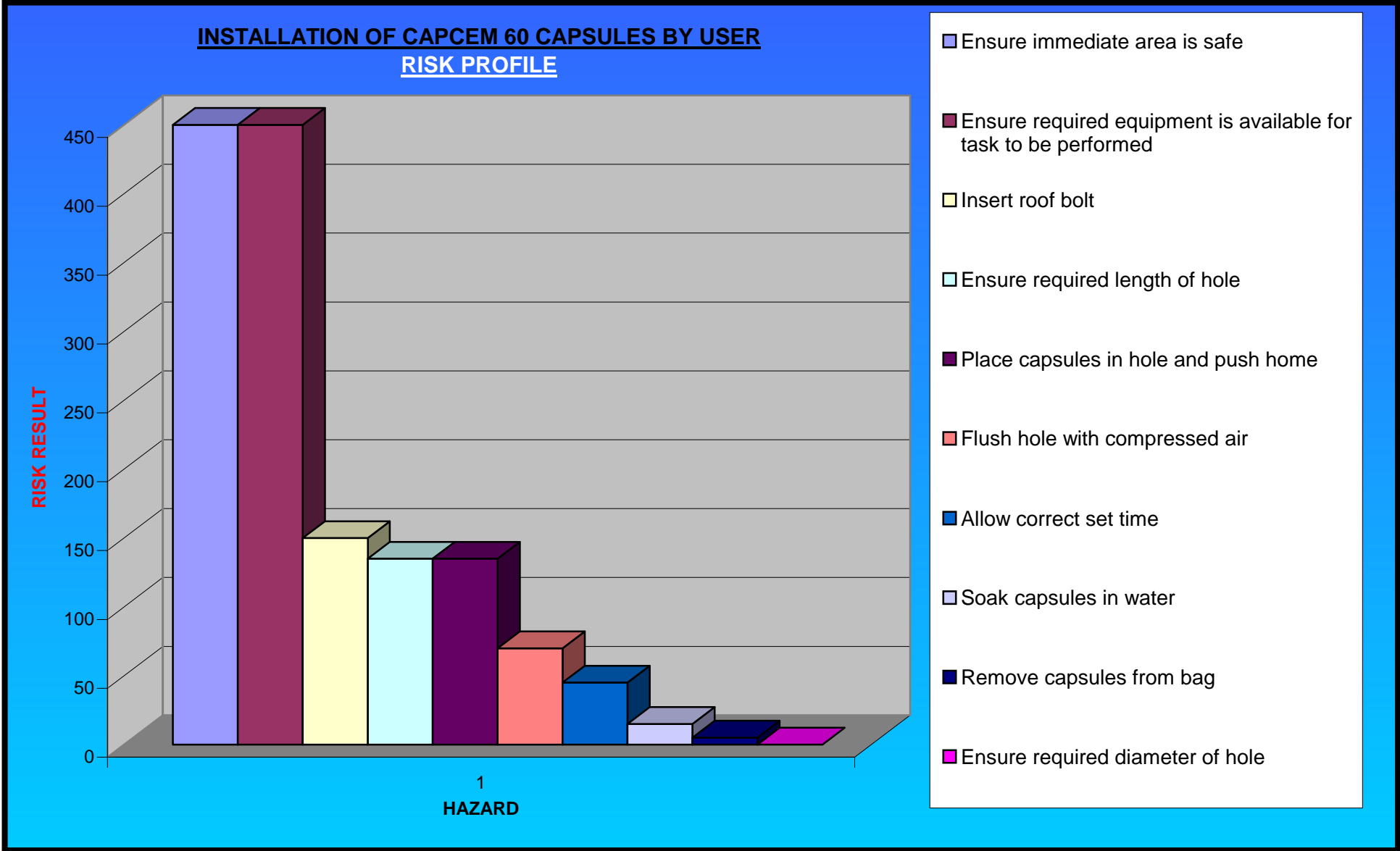
No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
1.	<b>Ensure a safe area for storage purposes</b>	Loose hang or side wall, old and abandoned areas, no ventilation, accumulation of fumes or gasses, excessive ground water, unsupported area	Personal injury, loss of product, financial loss	15	6	0.5	45	User to ensure a competent person ensures area for storage purpose is safe, by barring, and ensuring no old or abandoned areas is used for storage where there might be a shortage of ventilation which may cause a build up of fumes or gasses which may affect the health and safety of employees.
2.	<b>Area demarcated for article storage.</b>	No demarcated area	Loss of product, financial loss, damage to property, product becoming inferior, sub standard installation	15	6	0.5	45	User to demarcate area for storage purposes, area should be well ventilated, well illuminated, dry and controlled to ensure a good rotation of the articles. The demarcated area should preferably not be close to travelling or escape routes, which may cause these routes to be obstructed if articles are not stored properly.
3.	<b>Ensure correct stack height</b>	Capsule bags stacked too high	Loss of product	1	3	0.5	1.5	It is recommended that capsule bags are not stacked higher than one meter from ground floor level, to minimise damage to bags should bags fall from stack and to facilitate easier access for transport purposes.
4.	<b>Ensure sufficient clearances between articles and travelling ways</b>	Inadequate clearances, obstructed travelling ways	Personal injury, product damage	1	2	0.1	0.2	User to ensure area is properly demarcated and no travelling or escape routes are obstructed in any way to minimise the probability of personal injury or product damage.
6.	<b>Ensure easy accessibility</b>	Inadequate accessibility	Damage to product, possible injury	1	2	0.1	0.2	User to ensure proper demarcated areas to ensure sufficient access for employees required to transport, stack or move articles.
7.	<b>Safeguard against natural elements</b>	Water	Damage to product, product becoming inferior, sub standard installation	15	3	0.5	22.5	User not to store articles where the articles could be affected by water, the storage area should be as dry as possible to reduce the chance of the product being damage which may result in a sub standard installation ultimately.
8.	<b>Ensure fire extinguisher in close proximity.</b>	Sparks, open fires, polypropylene bags	Loss of product	1	0.5	0.1	0.05	User to make employees aware of the fire hazard posed by the capsule bags and no open fires or sparks should be allowed near the storage area of the articles.

## RECOMMENDED SAFE WORKING PRACTICE FOR THE STORAGE OF ARTICLES UNDERGROUND BY THE USER

Activity	Potential Hazard	Recommendation/Controls
<b>Ensure a safe area for storage purposes</b>	Loose hang or side wall, old and abandoned areas, no ventilation, accumulation of fumes or gasses, excessive ground water, unsupported area	User to ensure a competent person ensures area for storage purpose is safe, by barring, and ensuring no old or abandoned areas is used for storage where there might be a shortage of ventilation which may cause a build up of fumes or gasses which may affect the health and safety of employees.
<b>Area demarcated for article storage.</b>	No demarcated area	User to demarcate area for storage purposes, area should be well ventilated, well illuminated, dry and controlled to ensure a good rotation of the articles. The demarcated area should preferably not be close to traveling or escape routes, which may cause these routes to be obstructed if articles are not stored properly.
<b>Ensure correct stack height</b>	Capsule bags stacked too high	It is recommended that capsule bags are not stacked higher than one meter from ground floor level, to minimize damage to bags should bags fall from stack and to facilitate easier access for transport purposes.
<b>Ensure sufficient clearances between articles and travelling ways</b>	Inadequate clearances, obstructed travelling ways	User to ensure area is properly demarcated and no traveling or escape routes are obstructed in any way to minimize the probability of personal injury or product damage.
<b>Ensure easy accessibility</b>	Inadequate accessibility	User to ensure proper demarcated areas to ensure sufficient access for employees required to transport, stack or move articles.
<b>Safeguard against natural elements</b>	Water	User not to store articles where the articles could be affected by water, the storage area should be as dry as possible to reduce the chance of the product being damaged which may result in a sub standard installation ultimately.
<b>Ensure fire extinguisher in close proximity.</b>	Sparks, open fires, polypropylene bags	User to make employees aware of the fire hazard posed by the capsule bags and no open fires or sparks should be allowed near the storage area of the articles.

## E - INSTALLATION OF CAPCEM 60 CAPSULES BY USER:

RISK PROFILE – INSTALLATION OF CAPCEM 60 CAPSULES BY USER



No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
1.	<b>Ensure immediate area is safe</b>	Loose side or hanging wall, working without temporary support, poor ventilation, slippery surfaces, moving machinery	Personal injury, down time, financial loss, possible injury, production loss	15	10	3	450	User to ensure that a competent person declares area safe for installation of product, area should be barred down and temporary support installed for safe working purposes. The working area should be well ventilated to prevent a build up of dust.
2.	<b>Ensure required equipment is available for task to be performed</b>	Shortage of equipment, using contaminated water	Personal injury, sub standard installation, falls of ground, property damage, financial loss	15	10	3	450	Sufficient capsules to be on hand, charging stick of at least 2.4m, bucket with a source of clean water. It is recommended that if the equipment is not available that the installation be suspended until the equipment is made available. A TECHNICAL UNDERGROUND TRAINER IS PROVIDED BY THE SUPPLIER FOR ON SITE TRAINING.
3.	<b>Ensure required length of hole</b> <ul style="list-style-type: none"> <li>• 0.9m</li> <li>• 1.0m</li> <li>• 1.2m</li> <li>• 1.5m</li> <li>• 1.8m</li> <li>• 2.1m, or</li> <li>• 2.4m</li> </ul>	Not measuring drilled hole	Sub standard installation	15	3	3	135	User to ensure employees measure the length of hole to ensure correct installation, hole can be measured with a charging stick.
4.	<b>Flush hole with compressed air</b>	Compressed air, flying debris	Eye injury	7	10	1	70	Employees always to ensure the correct PPE such as goggles are used when performing this task.
5.	<b>Ensure required diameter of hole</b> <ul style="list-style-type: none"> <li>• 32mm</li> <li>• 34mm</li> <li>• 36mm, or</li> <li>• 38mm</li> </ul>	Not measuring hole, worn drill bits, crushed ground	Capsules are always smaller than the hole	0	0	0	0	Should the ground be crushed and capsules cannot be inserted alternative support methods to be considered.
6.	<b>Remove capsules from bag</b>	Cutting bag open with sharp objects, cutting bag open against side wall	Hand injury, damage to product	1	10	0.5	5	User to open the bag by cutting bag with suitable knife and remove capsules.

No.	Activity	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation/Controls
7.	<b>Soak capsules in water</b>	Using contaminated water, soaking for too long or too short	Sub standard	15	1	1	15	Employees to insert only correct number of capsules in water and soak until air bubbles stop, then remove and use.
8.	<b>Place capsules in hole and push home</b>	Not using PPE, Working at height, Slip and fall, shortage of charging stick	Eye injury, personal injury, sub standard installation	15	3	3	135	Ensure correct number of capsules are placed in hole and correct equipment is used.
9.	<b>Insert roof bolt</b>	Slipping roof bolt, not using PPE, working at height, debris, shortage of equipment	Personal injury, sub standard installation, production loss, financials	15	10	1	150	Ensure employee has correct PPE for task and assistance is available on vertical installations
10.	<b>Allow correct set time</b>	Disturbance of bar before setting time complete, Removing temp support before setting is completed	Sub standard installation	15	3	1	45	User to ensure roof bolt are installed before blasting and allow for correct setting time to allow roof bolt and cement to set, blasting on roof bolts which is not set can result in sub standard installations

## RECOMMENDED SAFE WORKING PROCEDURE FOR THE INSTALLATION OF CAPCEM 60 CAPSULES BY USER

Activity	Potential Hazard	Recommendation/Controls
<b>Ensure immediate area is safe</b>	Loose side or hanging wall, working without temporary support, poor ventilation, slippery surfaces, moving machinery	User to ensure that a competent person declares area safe for installation of product, area should be barred down and temporary support installed for safe working purposes. The working area should be well ventilated to prevent a build up of dust.
<b>Ensure required equipment is available for task to be performed</b>	Shortage of equipment, using contaminated water	Sufficient capsules to be on hand, charging stick of at least 2.4m, bucket with a source of clean water. It is recommended that if the equipment is not available that the installation be suspended until the equipment is made available.
<b>Ensure required length of hole</b> <ol style="list-style-type: none"> <li>1. 0.9m</li> <li>2. 1.0m</li> <li>3. 1.2m</li> <li>4. 1.5m</li> <li>5. 1.8m</li> <li>6. 2.1m, or</li> <li>7. 2.4m</li> </ol>	Not measuring drilled hole	User to ensure employees measure the length of hole to ensure correct installation, hole can be measured with a charging stick.
<b>Flush hole with compressed air</b>	Compressed air, flying debris	Employees always to ensure the correct PPE such as goggles are used when performing this task.
<b>Ensure required diameter of hole</b> <ul style="list-style-type: none"> <li>• 32mm</li> <li>• 34mm</li> <li>• 36mm, or</li> <li>• 38mm</li> </ul>	Not measuring hole, worn drill bits, crushed ground	Should the ground be crushed and capsules cannot be inserted alternative support methods to be considered.
<b>Remove capsules from bag</b>	Cutting bag open with sharp objects, cutting bag open against side wall	User to open the bag by cutting bag with suitable knife and remove capsules.

<b>Activity</b>	<b>Potential Hazard</b>	<b>Recommendation/Controls</b>
<b>Soak capsules in water</b>	Using contaminated water, soaking for too long or too short	Employees to insert only correct number of capsules in water and soak until air bubbles stop, then remove and use.
<b>Place capsules in hole and push home</b>	Not using PPE, Working at height, Slip and fall, shortage of charging stick	Ensure correct number of capsules is placed in hole and correct equipment is used.
<b>Insert roof bolt</b>	Slipping roof bolt, not using PPE, working at height, debris, shortage of equipment	Ensure employee has correct PPE for task and assistance is available on vertical installations
<b>Allow correct set time</b>	Disturbance of bar before setting time complete, Removing temp support before setting is completed	User to ensure roof bolt are installed before blasting and allow for correct setting time to allow roof bolt and cement to set, blasting on roof bolts which is not set can result in sub standard installations

**F - INSPECTION ON ARTICLES BY USER BEFORE INSTALLATION:**

Component	Check/Test	In order	Out of order	Possible causes if not in order	Recommended controls
<b>Capsule bags</b>	Expiry date			Not using product rotation	User not to use product if date expired.
	No visible damage to bag			Manhandling, improper storage	Inspect content if capsules are damaged reject
	Check condition of cement in capsule for lumps etc.			Beyond shelve, exposed to natural elements	Damaged or hardened capsules not be used
	Check water not contaminated			Using old oil and diesel drums	Clean drums and only use clean water

**RECOMMENDED INSPECTION PROCEDURE FOR INSPECTION ON THE ARTICLES BY  
THE USER BEFORE INSTALLATION**

<b>Component</b>	<b>Check/Test</b>	<b>Recommended controls</b>
<b>Capsule bags</b>	Expiry date	User not to use product if date expired.
	No visible damage to bag	Inspect content if capsules are damaged reject
	Check condition of cement in capsule for lumps etc.	Damaged or hardened capsules not be used
	Check water not contaminated	Clean drums and only use clean water

**G - INSPECTIONS ON ARTICLES BY USER AFTER INSTALLATION:**

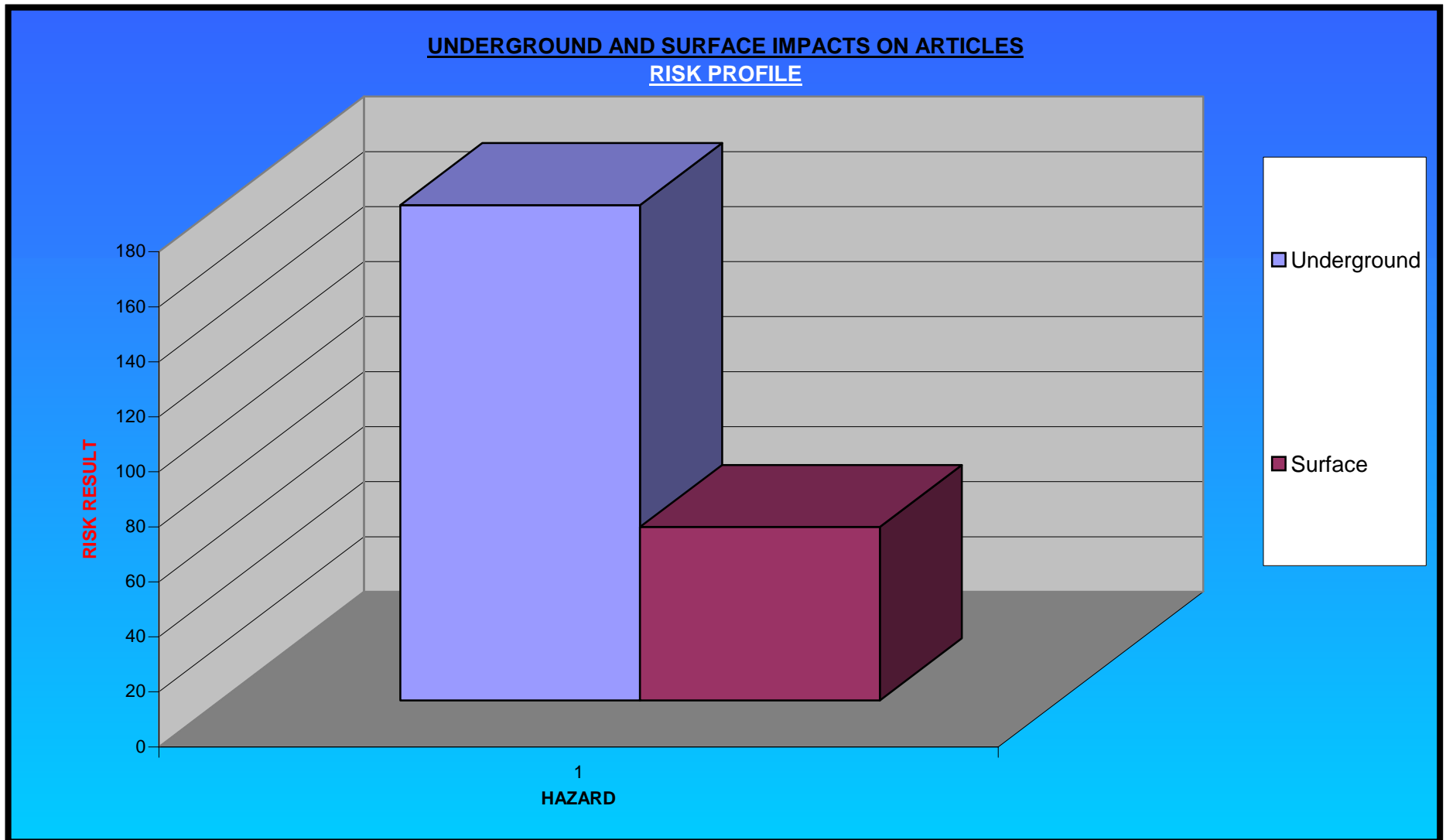
<b>Component</b>	<b>Check/Test</b>	<b>In order</b>	<b>Out of order</b>	<b>Possible causes if not in order</b>	<b>Recommended controls</b>
<b>Capsules</b>	Ensure hole is fully grouted			Incorrect installation	Re install to ensure a good quality installation

**RECOMMENDED INSPECTION PROCEDURE FOR INSPECTION ON THE ARTICLES BY  
THE USER AFTER INSTALLATION**

<b>Component</b>	<b>Check/Test</b>	<b>Recommended controls</b>
<b>Capsules</b>	Ensure hole is fully grouted	Re install to ensure a good quality installation

## H - UNDERGROUND AND SURFACE IMPACTS ON ARTICLES:

# RISK PROFILE – UNDERGROUND AND SURFACE IMPACTS ON ARTICLES



<b>Unit</b>	<b>Potential Hazard</b>	<b>Consequences</b>	<b>C</b>	<b>E</b>	<b>P</b>	<b>Risk Result</b>	<b>Recommendation</b>
<b>Underground</b>	Dust, contamination of water, waste bags, theft, blockages, fire hazard from bags, used for building waiting places or stores, used for damming water, used for tamping blast holes, building steps, used for anchoring winches, used for water plugging, used for construction work, incorrect storage of articles underground, uneven storage surface, moisture in storage environment, not controlling rotation of articles, using product with contaminated water, damaged products	Financial loss, failure due to improper application, personal injury, sub standard installation, fire	<b>3</b>	<b>10</b>	<b>6</b>	<b>180</b>	User to inform relevant supervisory levels of the designed use of the product and not to allow product to be abused or miss-used for any other application which might result in a financial or physical loss to the user. User to prevent entry into drains, sewers and watercourses. Avoid the creation of dust in atmosphere by gathering spillages into containers. Residues may be flushed into drains with large volumes of water.
<b>Surface</b>	Damaged product, incorrect storage, natural elements, theft, used for construction work, empty bags or shrink rapping posing fire risk, not rotating product	Financial losses, dust, sub standard installation, possible injury, and production loss.	<b>7</b>	<b>3</b>	<b>3</b>	<b>63</b>	User to store and handle articles correctly, to prevent any sub standard product being used for installation. Should any product be disposed of it is recommended that the user use a credible company to dispose of product. User to prevent entry into drains, sewers and watercourses. Avoid the creation of dust in atmosphere by gathering spillages into containers. Residues may be flushed into drains with large volumes of water. Prior consent must be obtained from the local Water Company if discharged to sewer.

**RECOMMENDATIONS FOR THE PREVENTION OF SURFACE AND UNDERGROUND  
IMPACTS ON THE ARTICLES**

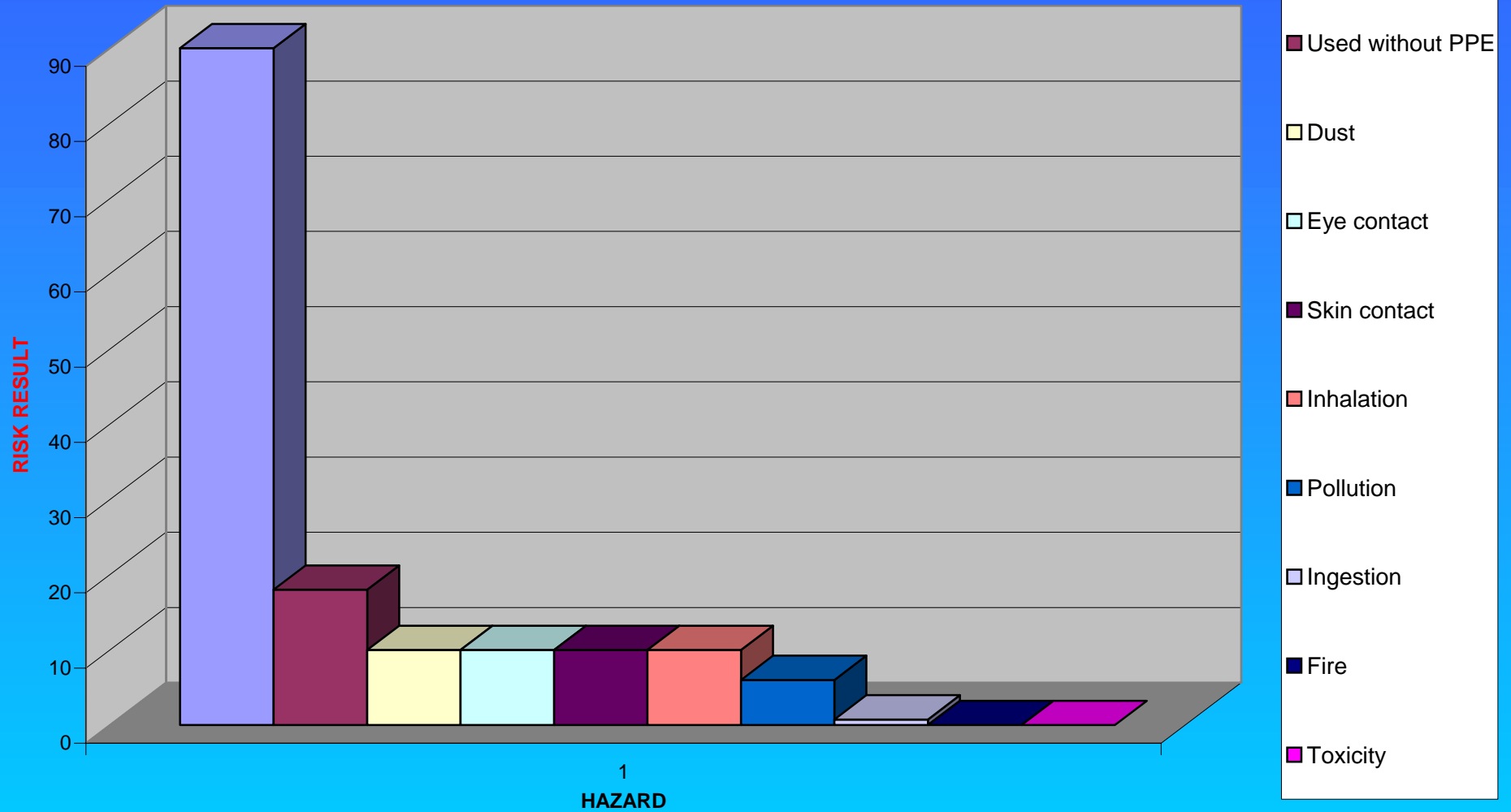
<b>Unit</b>	<b>Potential Hazard</b>	<b>Recommendation</b>
<b>Underground</b>	Dust, contamination of water, waste bags, theft, blockages, fire hazard from bags, used for building waiting places or stores, used for damming water, used for tamping blast holes, building steps, used for anchoring winches, used for water plugging, used for construction work, incorrect storage of articles underground, uneven storage surface, moisture in storage environment, not controlling rotation of articles, using product with contaminated water, damaged products	User to inform relevant supervisory levels of the designed use of the product and not to allow product to be abused or miss-used for any other application which might result in a financial or physical loss to the user. User to prevent entry into drains, sewers and watercourses. Avoid the creation of dust in atmosphere by gathering spillages into containers. Residues may be flushed into drains with large volumes of water.
<b>Surface</b>	Damaged product, incorrect storage, natural elements, theft, used for construction work, empty bags or shrink rapping posing fire risk, not rotating product	User to store and handle articles correctly, to prevent any sub standard product being used for installation. Should any product be disposed of it is recommended that the user use a credible company to dispose of product. User to prevent entry into drains, sewers and watercourses. Avoid the creation of dust in atmosphere by gathering spillages into containers. Residues may be flushed into drains with large volumes of water. Prior consent must be obtained from the local Water Company if discharged to sewer.

## I - CHEMICAL / HEALTH HAZARDS:

## **RISK PROFILE – CHEMICAL / HEALTH HAZARDS**

# CHEMICAL / HEALTH HAZARDS

## RISK PROFILE





Chemical	Potential Hazard	Consequences	C	E	P	Risk Result	Recommendation
<b>High Alumina cement</b>	Dust	Eye irritation, skin irritation, mouth and digestive irritation, lung irritation	1	10	1	10	Whenever using the capsules employees must use gloves, eye protection, rubber boots and dust masks, to protect them against any exposure to dust, which may cause eye, skin, throat or digestive irritancies.
	High pH	Irritation of eyes and skin, skin burns, contamination of water	3	10	3	90	Whenever using the capsules, storing the capsules or disposing the capsules ensure it does not come in contact with drinking or mining water, which may contaminate the water or cause blockages in the water.
	Fire	Not combustible, non flammable	0	0	0	0	This product is non-combustible, use extinguishing media appropriate to surrounding fire.
	Toxicity	Not toxic	0	0	0	0	
	Pollution	Contamination of water or blockages	1	6	1	6	User not to allow cement to be washed into drains, which may cause contamination or blockages but rather dispose of it by putting it into a disposal bin allocated for this purpose.
	Eye contact	Irritation	1	10	1	10	Immediately rinse eye with clean water, if irritation persists, seek medical attention. Always ensure clean water is available for this purpose.
	Skin contact	General irritation, minor skin burns	1	10	1	10	Employees with skin sensitivity should make use of a barrier cream to reduce contact risk with the product, or rinse of contact area with clean water. Obtain medical advice if skin disorders develop.
	Inhalation	Irritation of respiratory system	1	10	1	10	Employees to use dust masks to reduce the chance of inhaling the dust, which may cause irritation. If inhaled remove person from exposure and if feeling unwell obtain medical attention
	Ingestion	Irritation	1	0.5	0.5	0.75	Using the mouth should never open capsule bags; contact with cement may cause irritation in the mouth. If such contact takes place the employee should rinse the mouth using clean water, do not induce vomiting and obtain medical attention.
	Used without PPE	Irritation of eyes, lungs, skin	1	6	3	18	Employees to follow PPE instructions, to prevent any irritation caused by direct contact with cement.
<b>High Alumina cement with additives</b>	As per high alumina cement						

## RECOMMENDATIONS FOR THE TREATMENT OF CHEMICAL CONTACTS

Chemical	Potential Hazard	Recommendation
<b>High Alumina cement</b>	Dust	Whenever using the capsules employees must use gloves, eye protection, rubber boots and dust masks, to protect them against any exposure to dust, which may cause eye, skin, throat or digestive irritancies.
	High pH	Whenever using the capsules, storing the capsules or disposing the capsules ensure it does not come in contact with drinking or mining water, which may contaminate the water or cause blockages in the water.
	Fire	This product is non-combustible, use extinguishing media appropriate to surrounding fire.
	Toxicity	
	Pollution	User not to allow cement to be washed into drains, which may cause contamination or blockages but rather dispose of it by putting it into a disposal bin allocated for this purpose.
	Eye contact	Immediately rinse eye with clean water, if irritation persists, seek medical attention. Always ensure clean water is available for this purpose.
	Skin contact	Employees with skin sensitivity should make use of a barrier cream to reduce contact risk with the product, or rinse of contact area with clean water. Obtain medical advice if skin disorders develop.
	Inhalation	Employees to use dust masks to reduce the chance of inhaling the dust, which may cause irritation. If inhaled remove person from exposure and if feeling unwell obtain medical attention
	Ingestion	Using the mouth should never open capsule bags; contact with cement may cause irritation in the mouth. If such contact takes place the employee should rinse the mouth using clean water, do not induce vomiting and obtain medical attention.
	Used without PPE	Employees to follow PPE instructions, to prevent any irritation caused by direct contact with cement.
<b>High Alumina cement with additives</b>	As per high alumina cement	

## DESIGN INTENTION

***CEMENTITIOUS ANCHOR CAPSULES*** – To ensure full column grouting with cement having the correct set time and strength development to ensure a competent anchoring of the rock bolts in the drilled holes.

### ADVANTAGES:

- Cost effective;
- Easy to install;
- Quick to install;
- No maintenance required;
- Minimum labour required for installation;
- Easy to handle;
- Minimum storage space required;
- No fire hazard on cement;
- Durable;
- Enhances safety of work environment;
- Enhances safety on the face;
- Reduces rock falls;
- Reduce production loss;

- Enhanced cleaning operations;
- Reduced injuries;
- Less wastage of cement and water;
- Prolongs rock integrity;
- Supplied as complete unit;
- Ergonomic factors were considered during the design;
- Protects steel against corrosion;
- Supplied in water resistant bags;
- Enhances life of mine.

#### **DISADVANTAGES:**

- Could cause minor injury if not handled properly;
- Poses a minor health hazard;
- Co-operation between grout and bolt suppliers a necessity;
- Good supervision required;
- Always requires a dry area for storage;
- Opening the bag requires a sharp object to do so,
- Spilled product contributes to blocking drains;
- Requires PPE when used or handled;
- Open to abuse and misuse;
- Polypropylene bags posing a fire hazard.

## CONCLUSION

This risk assessment is not absolute and should always be seen as a live document, because risk assessment in any form is a process and not a once-off activity.

Part of this process is that the user receiving the risk assessment from the supplier should scrutinize it, make recommendation or relevant comments and contribute to the assessment to make it more suitable and sufficient and thus more applicable for the proper use of the articles.

Should any recommendations be made from the user, or the supplier should add or remove anything as far as the design of the article is concerned, such recommendations or changes should be incorporated into this risk assessment, thus, the risk assessment should be revised for its adequacy.

Most importantly is that the user should take the recommended specified steps made by the supplier, evaluate them for practical implementation, and incorporate the information into the organizations specific training material, and train employees accordingly. This must be done to ensure the employees responsible for using the articles are familiar with potential hazards and risks they or any other employee might be exposed to.

Only then one can ensure as far as reasonably practicable the articles will be used properly.

If any significant problems or health and safety issues is identified by the user, and the user would like to bring it under the attention of the supplier, the supplier can be contacted at the following numbers:

**Office** - **011-908-1980; or**

**E-mail** - **info@minovaint.co.za**

## RISK MEASUREMENT INDEX

### CONSEQUENCES (Worst case scenario if hazard should realize)

	Index Value	Result
Catastrophic (many fatalities or damage over R100,000,000)	100	
Disaster (a few fatalities or damage over R10,000,000)	40	
Very Serious (one fatality or damage over R1,000,000)	15	
Serious (serious injury or damage over R 100,000)	7	
Important (temporary disability or damage over R10,000)	3	
Of Concern (minor injury or damage over R1,000)	1	

### EXPOSURE (How often hazardous event occurs or is present)

	Index Value	Result
Continuous (many times daily)	10	
Frequent (once daily)	6	
Occasionally (once per week to monthly)	3	
Unusual (once / month to once / year)	2	
Rare (yearly)	1	
Very rarely (not known to have occurred but remotely possible)	0.5	

### PROBABILITY (Chance of loss / harm during the exposure period)

Current controls / safeguards in place to be objectively assessed for sufficiency.

	Index Value	Result
Is the most likely and expected result if event occurs	10	
Quite possible (50/50 chance)	6	
Unusual but possible	3	
Only remotely possible (has happened somewhere)	1	
Conceivable but very unlikely (hasn't happened yet)	0.5	
Practically impossible (one in a million)	0.1	

$$\text{RISK RESULT} = \text{CONSEQUENCE} \times \text{EXPOSURE} \times \text{PROBABILITY}$$

## RISK CLASSIFICATION

<b>MORE THAN 400</b>	<b>Very High Risk, immediate correction with high level input</b>
<b>200 to 400</b>	<b>High Risk, immediate correction required</b>
<b>70 to 200</b>	<b>Substantial Risk, correction needed</b>
<b>20 to 70</b>	<b>Possible Risk, attention indicated</b>
<b>LESS THAN 20</b>	<b>Risk perhaps tolerable as is</b>

### RISK REDUCTION

<b>% REDUCTION</b>	<b>DESCRIPTION</b>	<b>VALUE</b>
<b>10%</b>	<b>SMALL</b>	<b>6</b>
<b>20%</b>	<b>SMALL</b>	<b>4</b>
<b>50%</b>	<b>EFFECTIVE</b>	<b>3</b>
<b>75%</b>	<b>VERY EFFECTIVE</b>	<b>2</b>
<b>100%</b>	<b>ELIMINATED</b>	<b>1</b>

### ESTIMATED COSTS

<b>More than R1 000 000</b>	<b>10</b>
<b>R500 000 – R1 000 000</b>	<b>6</b>
<b>R100 000 – R500 000</b>	<b>4</b>
<b>R50 000 – R100 000</b>	<b>3</b>
<b>R20 000 – R50 000</b>	<b>2</b>
<b>R10 000 – R20 000</b>	<b>1</b>
<b>Less than R10 000</b>	<b>0.5</b>

### PRIORITY SCALE

<b>PRIORITY =</b> $\frac{\text{RISK RESULT}}{\text{RISK REDUCTION} \times \text{ESTIMATED COST}}$	<b>100</b>	<b>HIGH</b>
	<b>80</b>	
	<b>60</b>	
	<b>50</b>	
	<b>40</b>	
	<b>20</b>	<b>MEDIUM</b>
	<b>10</b>	
	<b>8</b>	
	<b>6</b>	
	<b>4</b>	
<b>3</b>	<b>LOW</b>	
<b>2</b>		
<b>1</b>		

This sheet does not constitute or substitute for the users own assessment of workplace risk, as required by other health and safety legislation.



## TECHNICAL DATA SHEET CAPCEM 60\* CAPSULE

### Cementitious anchor grout

#### Uses

For easy grouting in rock anchoring applications, particularly overhead roof bolting as encountered in mining and tunnelling.

#### Advantages

- Encapsulated - Controlled water : powder ratio.
  - Eliminates mixing equipment.
  - Minimal wastage of grout.
- Non-shrink - Expansion agents counteract shrinkage and ensure effective contact between bar and grout.
- Chloride free - Rapid strength development without the use of chlorides, ensures absence of corrosion.
- Thixotropic - No loss of grout even from overhead holes, due to the thixotropic nature of the grout.

#### Description

Capcem capsules are supplied as ready to use dry powder encapsulated in a water permeable skin. When required for use, the capsules are soaked in water which is absorbed through the skin, forming a thixotropic non-shrink grout. The capsules absorb the correct amount of water.

#### Setting Grades

Capcem capsules are available with two different grout setting times, the set time being a measure of the rate of the grout strength development.

The table below gives the minimum pull strength available per 200mm bond length on 16mm deformed rebar, 25°C, 1 hour after installation.

Capcem 1/4	4 tons
Capcem 1/2	2 tons

It must be noted that rock temperature will influence rate of set and strength gain; the higher the temperature, the faster the set and more rapid the strength gain.

Capcem 60 Capsules should only be used for rock temperatures in the range 15°C to 45°C, if rock temperature is outside this range, consult Minova RSA technical department.

#### Application instructions

The Capcem capsules are removed from their packaging, soaked in clean water for 3 minutes, or longer if there are still signs of air release (bubbling) from the capsules. Only 1 bag of capsules should be soaked at a time, otherwise the grout may begin to set before installation.

Once the contents of the capsules are thoroughly wetted out the capsules are removed from the water and inserted into the drilled hole with the aid of a charging stick or pneumatic gun until the hole has been filled. The bar is then wetted, inserted into the hole and pushed through the capsules to the back of the hole.

It is recommended that the capsules are used directly after having been soaked to obtain optimum results.

#### Packaging/Sizes

Capcem capsules are supplied in woven polypropylene carrying bags with an inner polythene liner. The following standard sizes are available :-

Capcem Capsule Sizes		
Diameter (mm)	Number per bag	Minimum Grout volume yield per capsule (ml)
25	30	125
28	28	150

**Note** Allowance should be made for wastage when estimating.

#### Storage/Shelf life

Capcem capsules have a shelf life of 12 months when stored unopened in the original bags in cool, dry conditions. Store out of direct sunlight to prevent degradation of packaging.

---

**Precautions****Health and safety**

Capcem capsules are non-toxic, but like all cements, are alkaline in nature. The use of gloves, goggles and dust mask is recommended. Splashes should be removed from skin and eyes by washing with plenty of clean water. In the case of splashes in the eyes, medical attention should be sought immediately. Refer to Material Safety Data Sheet.

**Technical Support**

Minova RSA provides a technical advisory service supported by a team of specialists in the field. The service includes on site assistance and advice on evaluation trials and laboratory work.

**Additional information**

Capcem capsules can also be used in conjunction with Fasloc resin capsules for full column grouting with a point anchor at the back of the hole for immediate support. Spinning in of the bolt is then required to mix the resin.

Minova RSA is a market leader specialising in the supply of high performance chemical products for the mining and tunnelling industries.

Minova RSA range of mining products includes anchoring and backfill systems, bagged cement products, high yield grouts, mine sealants, equipment and accessories, for which a brochure is available on request.

Minova RSA is an ISO 9002 accredited company.

**Important note**

Minova RSA products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Minova RSA endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.

Minova RSA  
Reg. No. 2001/027226/07, ISO 9002 Company

Head Office and Resin Factory:  
Cnr. Anvil & Brewery Streets  
Isando  
1600  
South Africa

Tel: (011) 923-1900 International(+2711)923-1900  
Fax: (011) 923-1935 (+2711)923-1935

E-Mail: [info@minovarsa.co.za](mailto:info@minovarsa.co.za)  
Web Page: [www.minovainternational.com](http://www.minovainternational.com)

Cement Factory & Research Centre:  
25 Botha Street  
Alrode  
1449  
South Africa

Tel: (011) 908-1980 International(+2711)908-1980  
Fax: (011) 864-4311 (+2711)864-4311

® trade mark of MINOVA RSA

## MATERIAL SAFETY DATA SHEET – CAPCEM 60 CAPSULE

### 1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

**Application** : Anchoring grout.  
**Company** : Minova RSA  
**Address** : P.O. Box 52, Isando, 1600  
**Telephone** : (011) 908-1980                      **Telefax** : (011) 864-4311

### 2. COMPOSITION / INFORMATION ON INGREDIENTS

**Composition** : Inert fillers, additives.

This product contains ingredients classified as hazardous. However, they are NOT present in sufficient quantities to warrant classifying the product as hazardous.

All constituents of this product are listed in EINECS (European Inventory of Existing Commercial Chemical Substances) or ELINCS (European List of New Chemical Substances) or are exempt. Refer to Section 8 for Occupational Exposure Limits.

### 3. HAZARDS IDENTIFICATION

Long term skin contact may cause health problems.

### 4. FIRST AID MEASURES

**Eyes** : Irrigate immediately with copious quantities of water for several minutes. Obtain medical attention if irritation persists.  
**Skin** : Wash immediately with copious quantities of water. Obtain medical advice if skin disorders develop.  
**Inhalation** : Remove from exposure. If feeling unwell obtain medical attention.  
**Ingestion** : Wash out mouth with water. **DO NOT** induce vomiting. Obtain medical attention.

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** : This product is non-combustible, use extinguishing media appropriate to surrounding fire.

**Special Exposure Hazards** : None.

**Special Protective Equipment** : None.

---

## 6. ACCIDENTAL RELEASE MEASURES

---

<b>Personal Precautions</b>	:	Wear rubber boots in addition to the recommended protective clothing.
<b>Environmental Precautions</b>	:	Prevent entry into drains, sewers and water courses.
<b>Decontamination Procedures</b>	:	Avoid the creation of dust in atmosphere. Gather into containers. Residues may be flushed to drain with large volumes of water. Prior consent must be obtained from the local Water Company if discharged to sewer.

---

## 7. HANDLING AND STORAGE

---

<b>Handling</b>	:	Avoid creating dust. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid skin and eye contact.
<b>Storage</b>	:	Store in a cool, dry area, maximum of 12 months.

---

## 8. EXPOSURE CONTROL / PERSONAL PROTECTION

---

<b>Occupational Exposure Limits</b>	:-	None assigned.
<b>Engineering Control Measures</b>	:	Use only in well ventilated areas. Where mechanical methods are inadequate or impractical, appropriate personal protective equipment must be used.
<b>Personal Protective Equipment</b>	:	Impervious gloves (eg PVC). Goggles / Safety Glasses. Approved dust mask.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

<b>Physical State</b>	:	Powder supplied in capsule skin.
<b>Colour</b>	:	Grey.
<b>Odour</b>	:	Odourless.
<b>pH (working dilution)</b>	:	>10.
<b>Boiling Point / Range (°C)</b>	:	Not applicable.
<b>Flash Point (closed, °C)</b>	:	None.
<b>Autoflammability (°C)</b>	:	Not applicable.
<b>Oxidising Properties</b>	:	Not determined.
<b>Relative Density (at 20°C)</b>	:	1.5 approx., loose bulk.
<b>Water Solubility</b>	:	Partially soluble.

---

## 10. STABILITY AND REACTIVITY

---

<b>Stability</b>	:	Stable.
<b>Conditions to avoid</b>	:	Exposure to air. Contamination with water.
<b>Materials to avoid</b>	:	Strong acids.
<b>Hazardous Decomposition Products</b>	:	None.

=====
11. TOXICOLOGICAL INFORMATION
-----

Health Effects

- On Eyes : May cause transient irritation.
On Skin : May cause transient irritation.
By Inhalation : May cause transient irritation.
By Ingestion : May cause irritation of mouth, throat and digestive tract.
Chronic : Repeated and prolonged skin contact may lead to skin disorders.

=====
12. ECOLOGICAL INFORMATION
-----

- Environmental Assessment : Little detailed information is available on the ecological effects of this product, but its overall environmental impact is not regarded as significant.
Mobility : Partially soluble in water.
Persistence and Degradability : Not readily biodegradable.
Bioaccumulative Potential : Not expected to be bioaccumulative.
Ecotoxicity : Not expected to be ecotoxic to fish / daphnia / algae.

=====
13. DISPOSAL CONSIDERATIONS
-----

Disposal must be in accordance with local and national legislation.

- Unused Product : Disposed of in an approved manner.
Used/Contaminated Product : As for Unused product.
Packaging : The method of disposal must be acceptable to the local authority.

=====
14. TRANSPORT INFORMATION
-----

This product is NOT classified as dangerous for transport.

=====
   
**15. REGULATORY INFORMATION**
  
 -----

**Hazard Label Data** :-

This product is NOT classified as dangerous for supply in the UK.

<b>Safety Phrases</b>	:	Avoid contact with skin and eyes. Wear suitable gloves and eye / face protection. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.
<b>EC Directives</b>	:	Dangerous Substances Directive, 67/548/EEC and adaptations. Dangerous Preparations Directive, 88/379/EEC. Safety Data Sheets Directive, 91/155/EEC.
<b>Statutory Instruments</b>	:	Chemicals (Hazard Information and Packaging for Supply) (Amendment) Regs. 1996 (SI 1092). Health & Safety at Work etc. Act 1974. Control of Substances Hazardous to Health Regs. 1994 (SI 3246).
<b>Codes of Practice</b>	:	Waste Management. The Duty of Care.
<b>Guidance Notes</b>	:	Occupational skin diseases : Health and Safety Precautions (EH 26). Dust in the workplace : general principles of protection (EH 44). Occupational exposure limits (EH 40).

 =====
   
**16. OTHER INFORMATION**
  
 -----

Minova RSA is an ISO 9002 accredited company.

The data advice given apply when the product is used for the stated application or applications. The product is not sold as suitable for any other application. Use of the product for applications other than as stated in this sheet may give rise to risks not mentioned in this sheet. The product should not be used other than for the stated application or applications without seeking advice from Minova RSA.

If this product has been purchased for supply to a third party for use at work, it is the purchaser's duty to take all necessary steps to secure that any person handling or using the product is provided with the information in this sheet.

It is the responsibility and duty of the employer to inform employees and others who may be affected of any hazards described in this sheet and of any precautions which should be taken.

This sheet does not constitute or substitute for the users own assessment of workplace risk, as required by other health and safety legislation.

## CEMENT & CONCRETE INSTITUTE TEST REPORT ON CEMENTITIOUS CAPSULES



---

This report shall not be reproduced, except in full, without written approval from C&CI

Ref: 110/99/KAT/ldb  
Client: Fosroc Stratabolt

Date: 21 April 1999

### TEST REPORT ON CEMENTITIOUS GROUTING CAPSULES

#### CLIENT

Fosroc Stratabolt, PO Box 123910, Alrode, 1451.

#### BRIEF

The Cement and Concrete Institute was requested to test cementitious grouting capsules for pull out strengths.

#### SAMPLES

The following samples were received on 14 April 1999 for testing:

- Fosroc Stratabolt - Conbextra Medium Set (25 x 320 mm) batch no. 58139

#### TESTS

Tests were carried out in accordance with AAC specification 273/1 issue 9 using 500-mm long pipes.

Tests were carried out in accordance with SABS 1745199X using the 250- mm long pipes.

This report shall not be reproduced, except in full, without written approval from C&CI


Ref: 110/99/KAT/ldb  
Client: Fosroc Stratabolt

Date: 21 April 1999

## RESULTS

Pull out strength test:

Product	Test method	Age at test (hrs)	Pipe length (mm)	Force (kN)	
				Individual	Average
Fosroc Stratabolt - Conbextra Medium Set	AAC spec 273/1 issue 9	4	500	120	123
		4	500	125	
Fosroc Stratabolt - Conbextra Medium Set	SABS 1745199X	4	250	77	72
		4	250	67	
Fosroc Stratabolt - Conbextra Medium Set	AAC spec 273/1 issue 9	2	500	100	103
		2	500	105	
Fosroc Stratabolt - Conbextra Medium Set	SABS 1745199X	2	250	50	53
		2	250	55	



K A THEODOSIOU Pr Eng BSc (Civil Eng)

This report was reviewed by: H J GOODMAN Pr Eng MSc (Eng)



This report shall not be reproduced, except in full, without written approval from C&CI

Ref: 129/2000/KAT/ldb  
Client: Fosroc Stratabolt (Pty) Ltd

Date: 13 July, 2000

## TEST REPORT OF CEMENTITIOUS GROUTING CAPSULES

### CLIENT

Fosroc Stratabolt (Pty) Ltd, PO Box 123910, Alrode, 1451.

### BRIEF

The Cement and Concrete Institute was requested to test cementitious injection for pull out strengths.

### SAMPLES

The following samples of CAPCEM 601/4 capsules were received 23 June 2000:

Sample no.	Batch no.	Shaft number at Impala Platinum Mine
1	72532	9
2	72532	7
3	71033	11
4	72678	10
5	73049	12
6	No number	12
7	72645	-

### SAMPLE PREPARATION AND TESTING

The bagged material was used to bond a 16 mm or 10 mm diameter deformed reinforcing bar into a 50 mm inside diameter steel pipe 200 mm long. The specimens were tested after the curing for 1 hour. The test specimens were prepared by Fosroc Stratabolt personnel. The water used to mix the grout was at 25 °C, and the test samples were left in a temperature-controlled room at 23 °C and humidity greater than 90 % for the curing period. The specimens were "pulled" until failure.



This report shall not be reproduced, except in full, without written approval from C&CI

Ref: 129/2000/KAT/ldb  
Client: Fosroc Stratabolt (Pty) Ltd

Date: 13 July, 2000

## RESULTS

Test no.	Batch no.	Shaft no.	Reinforcing diameter (mm)	Force (kN)
1	72532	9	16	53
2	72532	7	16	65
3	71033	11	16	55
4	71033	11	10	38
5	71033	11	10	38
6	72678	10	16	67
7	73049	12	16	53
8	73049	12	16	38
9	73049	12	16	55
10	No number	12 <sup>u</sup> / <sub>G</sub>	16	54
11	No number	12 <sup>u</sup> / <sub>G</sub>	16	54
12	72645	-	16	54

<sup>u</sup>/<sub>G</sub> Underground

The mode of failure in all twelve pull tests was grout bond failure.

A handwritten signature in black ink, appearing to read 'K A THEODOSIOU'.

K A THEODOSIOU Pr Eng BSc (Civil Eng)

This report was reviewed by: Dr G R H GRIEVE Pr Eng PhD (Eng)



This report shall not be reproduced, except in full, without written approval from C&CI

Ref: 284/98/KAT/ldb  
Client: Fosroc Stratabolt (Pty) Ltd

Date: September 4, 1998

## TEST REPORT OF CEMENTITIOUS GROUTING CAPSULES

### CLIENT

Fosroc Stratabolt (Pty) Ltd, PO Box 52, Isando, 1600.

### BRIEF

The Cement and Concrete Institute was requested to test cementitious grouting capsules for pull out strengths.

### SAMPLES

The following samples were received on 25 August 1998.

Sample no.	1	2
Grout type	Conbextra Fast Capsule	Conbextra Medium Capsule
Batch no.	48357	-

### SAMPLE PREPARATION AND TESTING

The bagged material was used to bond a 16 mm diameter deformed reinforcing bar into a 50 mm inside diameter steel pipe either 200 mm or 500 mm long. The specimens were tested after the following curing times: 1 hour and 2 hours for the Conbex fast; 2 hours and 4 hours for the Conbex medium grout. The test specimens were prepared by Fosroc Stratabolt personnel. The water used to mix the grout was at 25 °C, and the test samples were left in a temperature controlled room at 24 °C and humidity greater than 90 % for the curing period. The specimens were "pulled" until failure.



This report shall not be reproduced, except in full, without written approval from C&CI

Ref: 284/98/KAT/ldb  
Client: Fosroc Stratabolt (Pty) Ltd

Date: September 4, 1998

## RESULTS

Product	Length of steel pipe (mm)	Age at test (hrs)	Force kN		Mode of failure
			Individual	Average	
Conbextra Fast	200	1	50	47,5	grout bond
	200		45		
	200	2	80	85	grout bond
	200		90		
	500	2	130	120	yielding of reinforcing
500	110				
Conbextra Medium	200	2	45	47,5	grout bond
	200		50		
	500	2	125	117,5	yielding of reinforcing
	500		110		
	500	4	130	130	yielding of reinforcing reinforcing broke
500	130				

A handwritten signature in black ink, appearing to read 'K A THEODOSIOU'.

K A THEODOSIOU Pr Eng BSc (Civil Eng)

This report was reviewed by : H J GOODMAN Pr Eng MSc (Eng)



**MANUFACTURERS  
OF  
ROCK ENGINEERING SOLUTIONS**

## **THE MINOVA RSA COMPANY**

Fosroc Stratabolt was formed in 1997, by the merger of Stratabolt Products, and Fosroc, both leading suppliers of rock support products to the South African Mining industry. Fosroc Stratabolt now trades as Minova RSA, and is a member of the Minova International Group which manufactures and supplies advanced rock-engineering materials in all of the world's major mining countries.

The company operates an integrated research, development and manufacturing facility in the hub of the diverse and technically demanding Southern African Mining Industry. Minova RSA's products are used in every sector of that industry and are exported world-wide.

Through our own research and access to the research of other Minova International companies we aim to ensure that our customers maintain leadership in improving the safety and productivity of underground excavation. The spectrum of products supplied enables mining engineers to choose unique solutions to unique rock engineering problems. We invite the active participation of our customers in product conception and improvement.

We manufacture resin grouting capsules, cement grouting capsules, high-yield and foamed grouts and other advanced technology cements. We also supply backfilling systems.

Witwatersrand Mining Supply Corporation (Wimico), a sister company in Minova International, is a specialist mining contractor, undertaking rock stabilization, void filling and underground construction.

The combination of Minova RSA and Wimico enables us to provide complete solutions to our customers.

## MAIN PRODUCTS

### FASLOC ® polyester resin capsules

Minova RSA manufactures Fasloc ® resin rock-bolting capsules under licence from E.I. du Pont de Nemours & Co. (Inc). Fasloc ® is the leading rock-bolting resin in Southern Africa and has long held a similar position in North America.

Fasloc ® capsules have a unique composition and construction. The resin compartment contains coarse filler particles, which aid in shredding the sheath and then interlock to increase the strength and rigidity of the grout. The catalyst compartment comprises 30 percent of the capsule, which materially improves intermixing of the components. These characteristics give the user unparalleled reliability of installation, tolerance of wide bar/hole annuli and simplicity of operation.

Fasloc® is available ex-stock in setting times from 15 seconds to 15 minutes and diameters from 19mm to 35mm. Special setting times and sizes are available on request. The Fasloc® capsules manufactured by Minova RSA comply with South African National Standard ("SABS") No. 1534: 1991 and carry the SABS mark of quality.

Minova RSA also manufactures the unique 2-Speedie resin capsule system which contains two different resin set times within the same capsule.

### CAPCEM ® cement grouting capsules

Cement capsules are used with grout bars to achieve full-column cement grouting.

The blended cement is encapsulated in a porous sheath, which allows controlled water absorption for correct wetting of the grout.

Capcem® capsules are available in 25mm and 28mm diameters and fast setting times allowing a 500mm length of grout to support a 50 kN load applied to an embedded 16mm rebar, after only 1 hour.

TEKSET® high-yield grouts

These patented high-yield grout formulations are designed to be mixed with a fixed quantity of water and pumped under pressure into high strength polypropylene bags for timber pack pre-stressing. The grout will generate a minimum strength of 0,3 MPa in two hours and achieve a minimum strength of 4 MPa within 7 days.

Their primary use is to pre-stress timber packs, giving semi-active and immediate support as well as making the packs blast-resistant. The grouts are also suitable for void filling.

TEKSET® is supplied in nominal 11kg bags.

AIR-O-CEM® and TEKSEAL® foamed grouts.

When placed with a custom-made pump, these grouts produce low-density foams suitable for void filling and the creation of ventilation, backfill and blast barriers. They are supplied in nominal 25kg bags.

***PUMPED CEMENT GROUTING SYSTEMS***

The Capram ® system is manufactured by Minova RSA under licence from Delkor Technik.

The system is designed to afford an easy method of reliably achieving full column cement grouting in a hole of any size. It can be used for pre- or post- grouting.

The equipment components are a simple pressure-differential axial pump which operates on compressed air (minimum pressure 3 bar) and a lance of 12mm to 30mm diameter. The grout is pre-packed in a porous sheath designed to optimise water absorption. The wetted grout bag is inserted into the pump and the grout ejected through flexible piping and the lance to the back of the hole. The sheath is retained in the pump and discarded after use.

The pumps are available ex-stock and the grouts are supplied in packages of nominal dimensions 90mm x 400mm long. Setting times are medium (2 hours) and slow (4-6 hours).

The Capcem Injection Grout System consists of blended cement grout (each bag sufficient to fill one typical rockbolt hole) and a hand held, air driven injector. The grout is mixed in its bag with water and then pumped into the hole with the injector.

LOKSET ANCHOR PACK pourable resin grouts

Scraper winches and other machinery may be rapidly bolted in place with LOKSET ANCHOR PACKS, which are a high-strength pourable resin grouts. They are supplied as a 10kg two-component pack in a mixing bucket. In use, the two components are mixed and poured into the anchoring holes, around the hold-down bolts. The equipment may be used within 2 hours.

TEKFLEX® structural membrane

Tekflex is a high-strength flexible coating for rock. When sprayed onto the surface of mine drives or tunnels it quickly forms a membrane which restrains loose rock, inhibits further deterioration and protects against weathering.

CABLESEAL® fire-retardant coating for cable and pipes

Cableseal is applied as a coating on cables and plastic pipes in mines. It prevents spread of fire along the cable or pipe runs. It is strongly adherent but flexible enough to accommodate flexure of the cable or pipe without breaking off.

FIRESHIELD® fire-resistant coating for timber

Fireshield is sprayed or painted onto timber support in underground workings to prevent spread of fire between packs or poles. It has passed stringent tests that convincingly demonstrate that a timber pack protected by Fireshield will remain intact despite adjacent packs burning completely.

FILLSET® AND CONBEX® backfilling systems

Minova RSA has developed additives that make run-of-mine tailings into effective backfill material. The additives bind the tailings and chemically retain water, accelerating strength gain and preventing shrinkage as the backfill sets. Each backfilling operation is unique so Minova RSA provides advice on design of backfill formulations and placing systems.

## **FACILITIES**

### *FASLOC ® resin capsule production*

Four capsule production lines employ mechanised and automated mixing to produce polyester and catalyst mastics for encapsulation by modified Kartridge Pak (KP) chub machines. The production lines are supported by a dedicated analytical laboratory for checking of incoming, in-process and finished goods.

Capacity: 500 tonnes per month

### *Cementitious grout manufacture*

Two automatically controlled blenders produce the grout blends for the packaging lines. Small diameter grouting capsules (Capcem) are formed on 3 banks of automatic filling machines. Large diameter capsules (Capram and Injection Grout) have their own filling section. Two bagging lines produce Tekset, Air-O-Cem, Tekseal and other bagged products. The cements plant has its own Quality establishment, including laboratories for routine quality control and product testing.

Capacity: 2500 tonnes per month

### *Research and Development*

A central laboratory and workshops are available for development and testing of new formulations and components. Equipment includes compressive and tensile testing machines, apparatus for conventional chemical analyses and rigs for testing anchor installation equipment and techniques.

### *Technical Service*

All field staff are experienced in mining and have received training in the characteristics and proper use of all our products. Minova RSA service includes:

- \* Product selection
- \* Application training and in-use auditing
- \* Stock management, transport and packaging

## **QUALITY MANAGEMENT**

Minova RSA gives quality management the highest priority. All incoming materials are checked against specifications before acceptance into process. Checks on the materials and process conditions are carried out at defined regular intervals, with feedback to operations to ensure continuous compliance. Samples of finished goods are rigorously tested for conformance with specifications and specimens are retained for reference. All key materials are lot-traceable through the process.

Regular analysis of the testing data is carried out to identify trends and areas for improvement. Critical areas of the plants are automated to reduce product variability.

The quality management systems used in the production of Fasloc<sup>®</sup> resin capsules and cement grouting products are listed by the South African Bureau of Standards (SABS) as complying with the requirements of ISO 9002/1994. Fasloc<sup>®</sup> has been granted the SABS mark for quality conforming to the requirements of National Standard SABS 1534:1991 for rock bolting resin capsules. The SABS conducts six-monthly audits of the quality systems as well as tests on the mark-bearing products.

# KEY PERSONNEL

## MANAGING DIRECTOR: DONALD O'CONNOR

Educational Qualifications B.Sc. Hons (Geophysics), MBA  
 Experience: **Project Leader:** Western Deep levels Mine  
**Project Manager:** NPI Group  
**General Manager:** Strataloc Resins  
**Managing Director:** Dantex Explosives  
**Technical Director:** RSA Products

## SALES & MARKETING DIRECTOR: PIERRE LOTTER

Educational Qualifications Diploma - Metalliferous Mining  
 Mine Managers Certificate of Competency  
 Experience: **Explosives Engineer & Sales Manager** - AECI  
**Marketing Manager** - Sasol Explosives  
**Marketing Director** - VAC AIR Technology

## TECHNICAL DIRECTOR: ROD SMART

Educational Qualifications Ph.D (Chemistry)  
**Post Doctoral study:** Pennsylvania State University, USA  
 Experience: **Product Development Manager:**  
 Fosroc Technology ., UK  
**Technical Manager:** Fosroc South Africa  
**Technical Director:** Minova RSA

## FINANCIAL DIRECTOR: LINDSAY HARRIS- DEWEY

Educational Qualifications B. Comm., B. Acc., C.A. (S.A.)  
 Experience: **Audit Senior : Ernest and Young** – Springs  
**Financial Manager:** Bevcan - a Division of Crown Nampac  
**Commercial Manager:** Bevcan  
**Financial Manager:** P.F.G. Building Glass

## HUMAN RESOURCES MANAGER: LORRAINE COUGHLAN

Educational Qualifications B Comm (Personnel Management) Hons  
 Experience: **Human Resources Manager** - HMR and Noristan  
**Personnel Consultant** – Johann Ribbens and Associates  
**Personnel Officer** – ESD

## OPERATIONS MANAGER: ALFREDO PIRODDI

Educational Qualifications National Diploma (Operations Management)  
 Experience: **Maintenance Foreman** – MCMS  
**Production Manager** – Coca Cola South Africa  
**Factory Manager** – Fosroc Stratabolt  
**Operations Manager** - Minova RSA

# CORPORATE INFORMATION

## **Official Company name**

Minova RSA - trading name of Stratabolt (Pty) Limited  
Company No.: 2001/027226/07

## **Physical Addresses:**

Head Office: Isando	Cnr Anvil & Brewery Roads, Isando
Resin Factory: Isando	Cnr Anvil & Brewery Roads, Isando
Cements Factory: Alrode	No. 25, Botha Road, Alrode

Postal Addresses: PO Box 52, Isando, 1600

## **Telecommunications:**

**TELEPHONE NUMBERS** (011) 923-1900 Isando  
(011) 908-1980 Alrode  
International: +(2711)

**FAX NUMBERS ISANDO:** (011) 923-1935 Main Office

**ALRODE:** (011) 864-4311 Technical Office  
(011) 908-5640 Main Office  
(011) 908-1977 Sales Office  
(011) 908-2389 Purchasing & Despatch  
International: +(2711)

**E-MAIL** [info@minovarsa.co.za](mailto:info@minovarsa.co.za)

**WEBSITE** [www.minovainternational.com](http://www.minovainternational.com)

## **Bankers:**

Standard Bank of South Africa  
Stratabolt (PTY) Ltd T/A Minova RSA  
Isando 01-25-42-43  
020133049

## **Auditors**

Ernst & Young  
Johannesburg

## WRITTEN UNDERTAKING FROM USER – FORMAT EXAMPLE

**Organisation:**

**Division:**

**Mine:**

**Date:**

Herewith a written undertaking, to take all specified steps sufficient to ensure, as far as reasonably practicable, that the articles will be used properly, and in such a manner that it will not effect the health and safety of persons working there with or in the vicinity of working with the articles.

**It is herewith we the user accepts the information supplied to be sufficient in ensuring the proper use of the articles.**

Signed on the \_\_\_\_\_ of \_\_\_\_\_ 2000, at \_\_\_\_\_.

**Manager:**

**Engineer:**

**Risk Manager:**

**Quality Control Officer:**

**Training Manager:**