

Safe system of work for the packaging,
loading, transport and unloading of mesh
to NSW underground mine sites



Produced by:
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INTRODUCTION

This safe system of work, *Packaging, Loading, Transport and Unloading of Mesh to NSW Underground Mine Sites*, has been compiled to assist suppliers, transport companies and end users to better assess risk and safety aspects associated with the Packaging, Loading, Transport and Unloading of mesh used in NSW mines.

This safe system of work can be referred to and should be considered in the management of all goods handling.

This Safe System of Work has been developed following the requirements of Risk Management Standards including the following principles:

- Review of previous incident data (Provided by NSW Department of Industry)
- Survey of Industry Representatives
- Site visits at selected Organisations
- Risk Assessment using Bow-Tie methodology
- Consultation with industry through a consultative forum

For further details on the methodology and lifecycle of the project refer to Appendix 1.

DEFINITIONS

Barrier

A control that is specific enough that its intended function can be defined and that its performance can be verified.

Bow tie methodology

A diagram that visualizes risk by providing a clear differentiation between proactive and reactive risk management whilst providing an overview of multiple plausible scenarios.

Consequence

A particular harmful outcome that would be prevented by the set of safeguarding measures (barriers) in place.

Consultation

The process of engaging with workers and others to consider a particular situation or scenario.

End users

For the purpose of this document 'end user' is any business that receives, unloads and stores materials on-site.

Fundamentally stable

For the purpose of this document, fundamentally stable is taken to mean an item of plant (delivery vehicle, trailer, forklift, telehandler, etc.) is parked, secured (chocked) or operated on a surface that does not lend itself to the plant overturning, rolling, free-wheeling or otherwise presenting as a risk to the health and safety of workers or others in the area.

Hazard

Something in, around or part of the organisation which has the potential to cause damage.

Materials

For the purpose of this document 'materials' is taken to include items that are loaded and unloaded using materials handling equipment such as forklifts and telehandlers, e.g. mesh, pipes, etc.

OEM

Original equipment manufacturer

Reasonable and practicable

Something that is, or that which is, or was at a particular time, reasonably and practicably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters.

Safe Standing Zones

A defined and identifiable area to where workers and others may locate to during the loading and unloading process.

Standard

For the purpose of this document 'standard' is taken to mean a document that has been developed for the purpose of ensuring loading, transport and unloading activities are carried out in a consistent manner.

SWL

Safe Working Load limit as determined by the manufacturer. Where determined, the SWL must be clearly visible on the relevant item of plant.

Threat

Events or states which could realistically lead to the top event in the absence of any safeguarding measures. These threats should be specific enough to ensure that the safeguards identified are relevant to the threat.

Top event

The moment when control is lost over the hazard and represents the worst case scenario if no mitigation barriers are in place

Transporter

Includes pod, trailer, forklift, telehandler and any associated vehicles used to transport materials on site.

Unloading zone

A defined area, identified by markers and with restricted access established for the purposes of unloading materials on-site.

SCOPE AND PURPOSE

The scope of this safe system of work extends to the *Packaging, Loading, Transport and Unloading of mesh at NSW underground mine sites*.

It is not intended that the scope of this safe system of work extend to the delivery and unloading of mesh in underground locations.

The document comprises two complementary elements: a risk assessment methodology and a suggested safe system of work.

The risk assessment methodology is intended as a reference point and foundation for developing a safe system of work.

The risk assessment tool serves as a high level of risk control only, and is intended for use where known, or foreseeable risks, and safety factors, may, as far as is reasonably practicable, be identified, assessed and controlled. Additional risk assessment and controls may be required depending on particular circumstances.

The risk assessment methodology also identifies controls which should be considered, where relevant, by those involved in Packaging, Loading, Transport and Unloading of mesh at NSW underground mine sites.

The safe system of work also outlines further considerations that should be taken into account at the different stages of the process.

The document should be read and considered within the context of each individual mines' existing safety management plans and systems as well as with regard to the situation, circumstances and conditions specific to each delivery of mesh.

The document should be considered as a foundation document for each site. End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated with Packaging, Loading, Transport and Unloading of mesh at NSW underground mine sites.

OBJECTIVE

The objective of the document is to provide manufacturers, suppliers, transport companies and end users with tools and guidance to assist in identifying, eliminating or controlling, as far as reasonably practicable, risks to health and safety associated with the supply and delivery of mesh to NSW mines.

Sites can use this document, where appropriate, as guidance for all goods handling activities.

LEGISLATION

The document does not in any way negate or replace legislative requirements.

A list of referenced legislation is included in Appendix 2.

APPLICATION

This safe system of work is intended to address the risk and safety considerations associated with the key lifecycle stages of Packaging, Loading, Transport and Unloading of mesh for NSW Mine Sites. This document should be referred to when mesh is:

- Ordered from a manufacturer / supplier
- Packaged (strapped) by the manufacturer / supplier
- Loaded onto suitable vehicles
- Transported to mine sites
- Unloaded at mine sites
- Stored / stacked on-site.

RISK MANAGEMENT METHODOLOGY

A bow tie risk assessment was undertaken and developed with the aim being to identify the high risk lifecycle threats (hazards) associated with handling underground (UG) mine mesh.

The ‘top event’ was identified as “loss of control of UG mine mesh load” and the following threats were identified through the risk assessment process:

- Load packaged incorrectly for transport
- Vehicle load excessive
- Load positioned incorrectly for transport
- Load secured incorrectly for transport
- Failure of packaging
- Vehicle incident / interaction during transport
- Additional load affects access
- Additional load affects securing
- Load accessed incorrectly
- Incorrect loading/ unloading equipment
- Loading /unloading method incorrect
- Load stored incorrectly
- Load positioned and secured incorrectly for on-site transport
- Vehicle incident / interaction onsite

- Incorrect equipment used.

In addition to the 'top event' the following (potential) consequences were identified as part of the risk assessment process:

- Damage to equipment – vehicle, forklift, telehandler, etc.;
- Injury to personnel; and
- Fatality.

The bow tie risk assessment is attached in Appendix 3. Sites should consider the details contained within the bow-tie as an overview of product lifecycle threats and their associated control barriers as initial guidance on how to best manage the threats.

Additional threats may exist depending on particular circumstances and situations unique to each site and relative to the Packaging, Loading, Transport and Unloading of mesh at underground locations.

Additional threats, where they have been identified, should be risk assessed by appropriately qualified / competent personnel and appropriate barriers (controls) put in place in line with the relevant risk management system.

PACKAGING FOR TRANSPORT TO MINE SITE

Where reasonable and practicable, end users, in consultation with the manufacturer should agree to a standard on how each consignment of mesh is to be packaged prior to delivery.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated with packaging of mesh for NSW underground mine sites.

PACKAGING THREATS

- Mesh is packaged incorrectly for transport and subsequent unloading at the mine site; and
- Failure of packaging.

PACKAGING CONSIDERATIONS

Where reasonable and practicable, manufacturers and end users should endeavor to confirm appropriate packaging standards are documented prior to processing any orders. If necessary, mines should also consider the need to follow-up with the manufacturer to clarify packaging standards and confirm that mesh will be packed as stipulated.

Where reasonable and practicable, end users and manufacturers should communicate in order to clarify and agree on the following considerations as a means of preparing a packaging standard for the transport of mesh to a mine site:

- Condition of equipment used to pack / strap mesh
- The type of equipment that will be used to unload the mesh on site
- The lifting capacity of the equipment to be used to unload the mesh

- Unloading facilities at site
- Access and manoeuvrability for vehicles and unloading equipment
- How mesh should be bundled, i.e. size of each bundle / number of bundles per stack
- The maximum weight of each bundle / stack
- The physical dimensions of each bundle / stack
- What material is to be used to strap the mesh, e.g. plastic, steel or wire ties
- How the mesh is to be strapped, i.e. single or double strapping
- How and where the strapping should be placed, i.e. at the ends or across the width of the bundle
- What, if any, additional strapping is required, e.g. slings, etc.
- What markings are to be evident on the mesh, e.g. bolt markings, weight of bundle, etc.
- What labels are to be attached, where they are to be attached and what information is to be included on each label
- Protocols for arriving on site, e.g. site access, driver induction, unloading zone protocols, etc.
- Appropriate lines of communication have been established between the manufacturer and end user
- In situations where Spotters are used care must be taken to ensure the use of the Spotter does not introduce additional risk to the process of packaging goods, including mesh.

As part of the mine inspection and verification system, in all situations where packaging standards have not been adhered to, the mine should consult with the manufacturer in order to establish and understand the reasons behind any packaging discrepancies.

RISK CONTROLS - PACKAGING

The following risk controls should be considered by the manufacturer/ supplier when packaging mesh:

- A documented packaging standard should be prepared and relevant workers should receive appropriate training and instruction in the packaging standard.
- Correct equipment, i.e. fit for purpose, serviced and maintained in accordance with OEM specifications should only be used when packaging goods, including mesh.
- Mesh manufacturers / suppliers should inspect and monitor all loads prior to departure from site to ensure the packaging is completed as per standard requirements. Checks should include, but are not limited to:
 - i. Strapping / wrapping as per standard
 - ii. Markings – weights, dimensions, bolt markers, etc. are clearly visible
 - iii. Quantity per bundle / stack is as per order
 - iv. Bundles are appropriately separated to facilitate unloading at end user site.
- Packaging sheet / label is checked and confirmed as accurate by manufacturer / supplier, e.g.:
 - i. Manufacturer's details
 - ii. Customer's order number
 - iii. Description of product, e.g. 'Mesh Gal'
 - iv. Dimensions, e.g. 2.5Mx1.7M 3&4MM Wire 100 x 100 AP Flush All Round
 - v. Product identification / serial number (if appropriate)
 - vi. Date packed
 - vii. Job number
 - viii. Pack number

- ix. Quantity / pack (if appropriate)
- x. Total weight
- xi. Confirmation that mesh has been manufactured in accordance with relevant Australian Standard, i.e. AS 4671.

Any loads failing to comply with the packaging standard should not be permitted to leave site until such time as appropriate corrective actions have been implemented and verified by the manufacturer / supplier.

LOADING FOR TRANSPORT TO SITE

Where reasonable and practicable, end users, in consultation with the supplier and the transport company should agree on a standard for how mesh consignments are to be loaded onto vehicles for transportation to site.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated with loading of mesh for transportation to NSW underground mine sites.

LOADING THREATS

- Failure of packaging during loading
- Failure of manufacturer to adhere to loading standard
- Failure of transport company to adhere to loading standard
- Vehicle is loaded excessively
- Vehicle is loaded incorrectly
- Load is positioned incorrectly for transport
- Load is not secured properly for transport
- Additional / secondary load affects securing of original load
- Additional / secondary load affects access to original load.

LOADING CONSIDERATIONS

End users, suppliers and transport companies should communicate in order to clarify and agree on the following considerations as preparation for loading mesh for transport to a mine site:

- Specific risks associated with the handling and placement of loads
- End user loading requirements / guidelines / standards / configuration and placement of mesh on transport
- Dimensions of load
- Total number of bundles / packs to be loaded (based on type of transport to be used)
- Types and placement of chains, straps and other securing devices
- How bundles are to be separated so as to better assist unloading on site, e.g. placement of dunnage between bundles
- Dimensions of dunnage to be used to separate bundles

- Security and stability of load (during transport)
- Ensuring that all labels and any markings are visible
- Implementation of effective safe standing zones, barricades, etc.
- Communication protocols during loading process
- Type of equipment to be used to unload mesh at mine site.
- In situations where spotters are used care must be taken to ensure the use of the spotter does not introduce additional risk to the process of loading goods, including mesh.

RISK CONTROLS - LOADING

The following risk controls should be considered by the manufacturer and supplier when loading mesh in preparation for transport to site:

- A documented loading standard should be prepared and relevant workers should receive appropriate training and instruction in the standard.
- Correct equipment, i.e. fit for purpose, serviced and maintained in accordance with OEM specifications should only be used when packaging goods, including mesh.
- Appropriate controls should be implemented during the loading process, e.g. safe standing zones, restricted access etc.
- Manufacturers and suppliers should inspect and monitor loading operations to ensure the loading is completed as per standard requirements. Checks should include, but are not limited to:
 - Application and effectiveness of safe standing zones, barricades, etc.
 - Placement of barricades, cautionary signage, etc.
 - Condition of equipment used to load mesh
 - Operator competency and experience
 - Effective communications between operator and delivery vehicle driver
 - Placement of load on vehicle is consistent with agreed standard
 - Size of load, load dimensions, configuration of load etc. are consistent with agreed standard
 - Number of bundles / packs is as per order and appropriate to transport
 - Separation of bundles / packs facilitates unloading
 - Placement of dunnage
 - Method of securing load – chain, straps, belts etc. is as per agreed standard.

Any loads failing to comply with the loading standard should not be permitted to leave site until such time as appropriate corrective actions have been implemented and verified by the manufacturer / supplier.

In situations where a secondary load (mesh or other materials) is subsequently loaded onto a vehicle, the delivery driver must ensure all of the above controls are followed with regard to the placement, accessibility and security of the subsequent load.

Care must be taken to ensure the placement and positioning of the secondary load in no way undermines the security, integrity or accessibility of other loads.

Refer to APPENDIX 4: Sample load shift assessment form

TRANSPORT TO SITE

Where reasonable and practicable, end users should develop a standard that outlines specific instructions and protocols which delivery drivers must follow upon arriving at site.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated with the delivery of mesh to NSW underground mine sites.

TRANSPORT THREATS

- Vehicle loaded excessively
- Load positioned incorrectly for transport
- Load secured incorrectly for transport (including securing failure)
- Failure of packaging during transport
- Vehicle incident / interaction during transport.

TRANSPORT CONSIDERATIONS

Where reasonable and practicable, end users and transport companies should communicate in order to clarify and agree on the following considerations with regard to transporting mesh to site:

- Has the transport company been used previously to deliver mesh to site?
- Has the driver previously delivered mesh to site?
- Considerations to be addressed if using a new transport company and / or new driver, i.e. communicating timely and appropriate information on:
 - Site access protocols
 - Driver induction process / requirements
 - Key site contacts
 - Location and layout of unloading zone
 - Site and unloading zone signage and markings
 - Site Safety Rules
 - Safe work procedures
 - Unloading protocols
 - Delivery days and times
 - Emergency deliveries
 - Protocols for arriving at site, e.g. check in / sign-in, etc.
 - Driver sign-in process
 - Unloading zone safety rules.
- Vehicle is road worthy and fit for purpose, i.e. suitable capacity including the need to take on additional loads if necessary
- Condition of internal road and general access to unloading site.
- Delivery driver must hold a current National Heavy Vehicle Driver's License
- Delivery driver must be familiar with the Heavy Vehicle Driver Handbook
- Delivery driver must be familiar with the NSW Road Users Handbook
- Supplier (and delivery driver) must be familiar with the NSW Load Restraint Guidelines

- Site roads and other vehicle operating areas management plan must be in place and available to supplier and delivery driver
- Delivery driver must have completed site sign-in
- Driver cannot proceed to unloading zone without permission from authorised mine staff
- Delivery driver should be familiarised with site transport and goods handling requirements.

RISK CONTROLS – TRANSPORT TO SITE

The following risk controls should be considered by the manufacturer and supplier when transporting mesh to underground mine sites:

- A documented transport standard should be prepared and relevant workers should receive appropriate training and/or instruction in the standard.
- Appropriate controls should be implemented during transport, e.g. road safety requirements.
- Manufacturers should inspect and monitor transport vehicles to ensure they are fit for purpose, road worthy and serviced and maintained in accordance with manufacturer's instructions.

In the event the load is impacted / compromised during transport the delivery driver should complete a full inspection of the load to ensure it is secure and that it is safe to proceed without having the load re-positioned or reloaded. Checks should include, but may not be limited to:

- Ensuring chains, straps, belts and other securing mechanisms remain secure and capable of restraining the load; and
- Ensuring that the load has not moved or been repositioned in a manner that may result in further movement during the onward journey.

IMPORTANT: If there is any doubt as to the security and / or integrity of the load, the delivery driver should not continue their journey and should contact the transport company and advise them of the situation.

In a situation where a load is compromised as a result of a traffic incident or interaction, the delivery driver should take appropriate action as per transport company requirements. An assessment of the load should be conducted prior to proceeding and delivering to site.

UNLOADING

Where reasonable and practicable, end users, in consultation with relevant workers, should complete a risk assessment of goods handling, including the process of unloading mesh on site.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated unloading of mesh at NSW underground mine sites.

UNLOADING THREATS

- The process of unloading mesh has not been risk assessed
- Unloading standard has not been developed OR has not been effectively communicated to relevant workers, including the delivery driver
- Inappropriate equipment is used to unload the mesh, e.g. lift capacity is insufficient
- The load shift equipment is not fit for purpose and any emergency and warning mechanisms are not working, e.g. load warning beeper
- The load shift equipment operator is not qualified, experienced or competent to unload mesh
- Usual telehandler / forklift operator is not available and a stand-in operator has to be used
- Delivery vehicle is parked on uneven ground
- Transport company / delivery driver is new to site
- Safe standing zones restrictions have not been put in place
- There is no safe standing zones for the driver
- Unloading zone is located in a shared work area / travel path
- Load is accessed incorrectly
- Incorrect unloading method is used
- There is little or no communication between the driver and the load shift equipment operator and other workers in the area
- The load shift equipment operator fails to complete a pre-unloading risk assessment
- Additional load impacts or restricts access to mesh to be unloaded
- Additional load impacts the integrity or security of mesh to be unloaded
- Unauthorized workers interacting during unloading process
- Weather conditions
- Failure / entanglement of load strapping or chains during unloading
- The load shift equipment operator attempts to lift a load that is too heavy for the equipment being used
- The load shift equipment operator ignores lift warning beeper in cab
- The load shift equipment view is temporarily restricted during unloading due to the movement of the tele arm.

UNLOADING CONSIDERATIONS

End users should consider the following factors as part of the planning and preparations for unloading:

- Specific risks associated with the handling and removal of loads
- Has the process of unloading mesh been risk assessed, and if so has the risk assessment been reviewed recently to ensure it remains current and complete?
- Has an unloading standard been developed and has it been effectively communicated to all workers likely to be involved in the process of unloading mesh?
- Have all relevant workers been trained in the unloading standard?
- Have unloading protocols been explained to all concerned?
- Is the unloading area ready to receive a delivery?
- Is the unloading area clearly identified and defined?
- Is the correct equipment available for unloading mesh?
- Is the unloading equipment fit for purpose, i.e. maintained and serviced regularly?
- Is there a qualified, competent and experienced operator available to carry out unloading? If not, is there a suitable back-up arrangement?
- Has the delivery driver been inducted or familiarised, directed to the unloading area and advised to await the arrival of the load shift equipment operator?
- Impact on production and operational requirements, e.g. other vehicles needing access to, or through, safe standing zones [production and operational priorities].
- A risk assessment must be completed before the unloading process commences. Items to be risk assessed should include, but are not limited to:
 - Load positioning
 - Packaging
 - Accessibility to bundles / packs
 - Weight and dimensions of bundles / packs
 - Size of bundles / packs
 - Suitability of unloading equipment e.g. is lift capacity sufficient and fit for purpose? etc.
 - Safe standing zones, access restrictions
- In situations where spotters are used care must be taken to ensure the use of the spotter does not introduce additional risk to the process of unloading goods, including mesh.

Refer to APPENDIX 4: Sample load shift assessment form

Refer to APPENDIX 5: Sample delivery driver familiarisation checklist

RISK CONTROLS - UNLOADING

The following risk controls should be considered by mine operators before and during the process of unloading mesh:

- A documented unloading standard should be prepared and relevant workers should receive appropriate training and instruction in the standard.
- Correct equipment, i.e. fit for purpose, serviced and maintained in accordance with OEM specifications should only be used when unloading goods, including mesh.
- Appropriate controls should be implemented during the unloading process, e.g. safe standing zones, restricted access etc.
- End users should inspect and monitor unloading operations to ensure the unloading is completed as per standard requirements. Checks should include, but are not limited to:
 - Application and effectiveness of safe standing zones, barricades, etc.
 - Placement of barricades, cautionary signage, etc.
 - Condition of equipment used to load mesh
 - Operator competency and experience
 - Effective communications between Operator and delivery vehicle driver
 - Placement of load on vehicle is consistent with agreed standard
 - Size of load, load dimensions, configuration of load etc. are consistent with agreed standard
 - Number of bundles / packs is as per order and appropriate to transport
 - Separation of bundles / packs facilitates unloading
 - Placement of dunnage
 - Method of securing load – chain, straps, belts etc. is as per agreed standard.

STORAGE

Manufacturers and end users should consider developing a site appropriate standard for storing goods, including mesh.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated the storage of mesh at NSW underground mine sites.

STORAGE THREATS

- There is no dedicated storage area and access to the storage area can be impacted by weather or surface conditions
- The travel path to the storage area is uneven or sloping
- The storage area is located in a shared operational area and subject to considerable interactions, e.g. other plant movements, adjacent to site road, etc.
- Load is stored in a manner that is inconsistent with the site storage and racking standard, e.g.:
 - Load is stored too high
 - There is insufficient separation between bundles / packs, i.e. correct dunnage is not used or is placed incorrectly
 - Stored bundles / packs are unbalanced
 - Bundles / packs are stored on unstable / uneven ground
- Access to storage area is impacted by poor housekeeping standards and / or other obstructions, e.g. other plant placed incorrectly

- Wrapping / strapping failed
- Racking, where used, is unstable or SWL exceeded
- There is restricted manoeuvrability in and around the storage area
- During unload and storage safe standing zones and barricading are not established
- Vehicle incident / interaction on site
- Load labels / tags are displaced during storage, or load is placed with label not visible
- Unloading is not undertaken as per standard.

STORAGE CONSIDERATIONS

Manufacturers and end users should consider the following when selecting and / or setting up a goods storage area, including mesh:

- Roles, responsibilities and authorities
- Layout of storage area – surface type (e.g. flat, hard stand), accessibility, lighting, manoeuvrability
- Height of stack(s)
- Specifications and placement of dunnage between bundles for stacking, i.e. Space between bundles
- Placement of bundles / packs so that labels and other critical markings are visible
- Type of surface on which stacks are placed
- Traffic management – access, restrictions, traffic flow, etc.
- Safe standing zones, use of barricades etc.
- Establishing a dedicated mesh storage zone accessible to vehicle unloading zone
- Erection of signage and other markers indicating the storage location
- Implementing a house keeping standard for the storage area, e.g. safe standing zones for vehicle parking and storage of other plant, equipment and materials
- Requirements for spotter during placement and retrieval of mesh.
- In situations where spotters are used care must be taken to ensure the use of the spotter does not introduce additional risk to the process of storing goods, including mesh.

RISK CONTROLS – STORAGE

Manufacturers and end users should consider implementing the following risk controls when storing mesh:

- A documented storage standard should be prepared and relevant workers should receive appropriate training and instruction in the standard.
- Correct equipment, i.e. fit for purpose, serviced and maintained in accordance with OEM specifications should only be used when storing goods, including mesh.
- Appropriate controls should be implemented during the storage process, e.g. safe standing zones, restricted access etc.
- End users should inspect and monitor storing operations to ensure the storage is completed as per standard requirements. Checks should include, but are not limited to:
 - Storage standard is being maintained
 - Housekeeping standards are maintained
 - The area is ready to receive mesh, and
 - There is no unauthorized use of the area, e.g. storage of other plant, equipment, and materials.

TRANSPORTING MESH ON SITE

Where reasonable and practicable, end users should develop a standard that outlines specific instructions and protocols for the preparation and transport of goods on site, including mesh.

End users are advised to develop and implement a 'Goods Handling Procedure' which may be used in conjunction with this document as a means of identifying and responding to hazards and risks associated the transport of mesh at NSW underground mine sites.

ON-SITE TRANSPORT THREATS

- Task risk assessment is not completed
- Incorrectly retrieving mesh from storage area
- Incorrect loading mesh onto transporter
- Incorrect selection of transporter
- Load positioned incorrectly on transporter
- Load incorrectly secured on transporter
- Incorrect equipment used to load mesh onto transporter
- Transporter overloaded
- Vehicle incident / interaction on site.

TRANSPORTING MESH ON SITE CONSIDERATIONS

End users should consider the following in relation to the transport of mesh on site:

- Roles, responsibilities and authorities
- Transport equipment is fit for purpose
- A roads and other vehicle operating areas risk assessment has been completed, considering goods handling risks
- Plant risk assessment / pre-start check has been completed for the transport equipment
- Transport operators have received appropriate training and instruction
- Type of equipment to be used for loading
- Transporter capacity / maximum number of bundles to be carried
- Configuration and positioning of mesh on transporter
- Requirements for lifting attachments, e.g. slings for underground lifts
- Load security, wrapping, strapping, etc.
- Load inspection prior to transport / movement
- Traffic management
- Safe standing zones, use of barricades etc.
- Personal Protective Equipment requirements
- In situations where spotters are used care must be taken to ensure the use of the spotter does not introduce additional risk to the process of transporting goods, including mesh, on site.

RISK CONTROLS – TRANSPORT ON SITE

The following risk controls should be considered when transporting mesh on site:

- A documented transport standard should be prepared and relevant workers should receive appropriate training and instruction in the standard.
- End users should inspect and monitor transport vehicles to ensure they are fit for purpose, road worthy (where required) and serviced and maintained in accordance with manufacturer's instructions.
- Appropriate controls should be implemented during transport, e.g. Roads and Other Vehicle Operating Areas Management Procedures (Transport Management).

GOODS HANDLING COMPLIANCE VERIFICATION AND REVIEW

End users are responsible for determining the frequency of goods handling compliance verification and reviews within the context of their individual site requirements and operational arrangements.

This document is a one-off publication and will not be subject to further review or amendment by the authors. The authors take no responsibility for the currency or accuracy of any information provided in this document post public release.

Individuals and organisations relying on this document do so at their own risk.

This document should only be relied upon in conjunction with other internal and external reference sources.

Refer APPENDIX 6: Goods handling compliance checklist

APPENDIX 1: METHODOLOGY AND PROJECT TIMELINE

This document originated from an Enforceable Undertaking which Donaldson Coal entered into with the NSW Department of Industry. The Undertaking was structured into six main stages resulting in this Safe System of Work.

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| <p>Stage 1 – Project commissioning and developing industry survey</p> <ul style="list-style-type: none">(i) select and appoint Project Personnel(ii) develop project brief / action plan and communicate it at high level to industry(iii) obtain NSW Department of Industry / SafeWork NSW data / information(iv) develop an industry survey tool |
| <p>Stage 2 – Implementing industry practice survey</p> <ul style="list-style-type: none">(i) conduct industry survey(ii) liaise with industry about survey including through site visits(iii) compile information/data provided |
| <p>Stage 3 – Development of risk-based tool</p> <ul style="list-style-type: none">(i) consider information / data provided through industry survey and NSW Department of Industry / SafeWork NSW(ii) develop risk-based tool which can be used to generate a site-specific standard / safe system of work document |
| <p>Stage 4 – Formation of a consultative group</p> <p>A consultative group of relevant stakeholders will be formed to ensure adequate review of key outcomes of industry survey and appropriateness of risk-based tool</p> |
| <p>Stage 5 – Develop draft safe systems of work for the packaging, loading, transportation and unloading of Mesh at underground coal mining sites</p> <p>The draft will be delivered to NSW Department of Industry for further application and implementation</p> |
| <p>Stage 6 – Provision of a risk-based tool and safe system of work template</p> <p>Proposed to make tool available to industry through NSW Department of Industry</p> |

For **Stage 1 and 2** NSW underground mine sites provided detailed responses to the industry survey created to obtain an understanding of current practices within NSW mines:

Survey responses obtained in **Stage 2** were collated to extract responses in relation each site's practices and included:

- General mine site information
- Use of roof mesh
- Mesh delivery and suppliers
- Laydown / delivery areas
- Safe standing zones
- Risk assessments
- Delivery requirements and times
- Mesh delivery personnel
- PPE requirements for delivery drivers, mine personnel and lifting equipment
- Communications when handling mesh
- Mesh transportation

- Mesh storage
- Incidents and near misses
- Safe systems of work
- Training.

For the purposes of **Stage 3** seven (7) NSW mine sites and respondents to the survey were visited to:

- Observe, document, and photograph the process for unloading mesh;
- Review documented procedures (where available) relative to the survey responses; and
- Interview key personnel, including load shift operators; Yard Supervisors; Health & Safety personnel and a delivery driver.

A consultative forum as outlined in **Stage 4** was subsequently held in Sydney in April 2016 to review and discuss data and findings from the survey and mine visits. The forum was attended by twenty-one (21) people representing manufacturers, suppliers, transport companies, mines, external consultants, the NSW Department of Industry and SafeWork NSW.

The major output of the consultative forum was the scoping of foreseeable hazards and associated risks associated with the Packaging, Loading, Transport and Unloading of mesh at NSW underground mine sites. This information was then used to populate the Bow-Tie risk assessment tool presented in Appendix 3.

This safe system of work document meets the requirements of **Stage 5** and has been developed to provide an overview to the lifecycle processes related to the handling of Underground Mine Mesh from packaging by the manufacturer to storage onsite at NSW underground mines.

As per the requirements of **Stage 6**, Donaldson Coal will make available the Risk Management Tool and this Safe System of Work through an online publication. End users can obtain copies as required via this publication.

APPENDIX 2: REFERENCES

The below references have been used as guidance materials for this Safe System of Work. Sites should also consider the applicability of any listed documents / references within their relevant risk / compliance management framework.

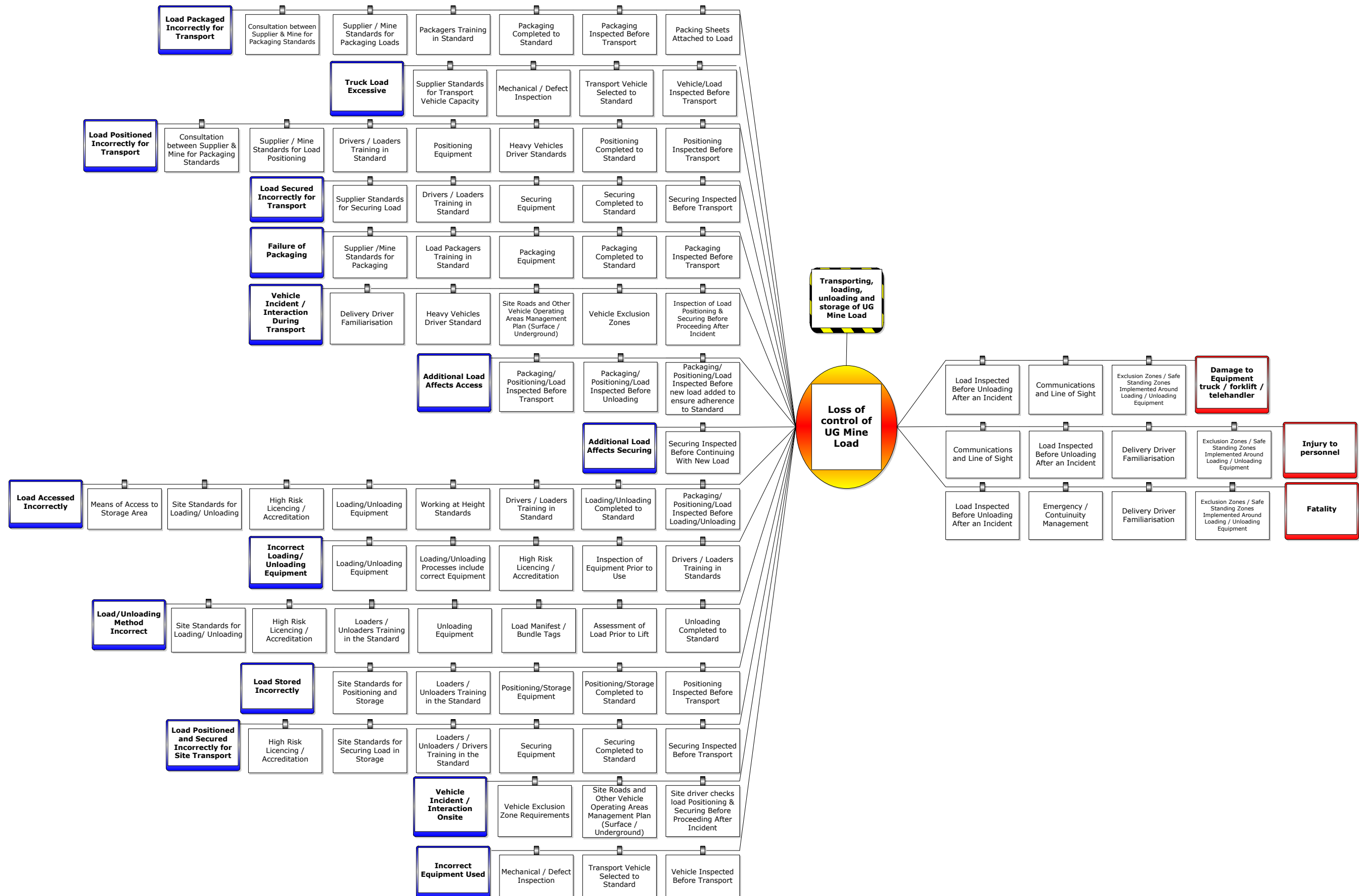
LEGISLATION

- Work Health & Safety Act (NSW) 2011
- Work Health & Safety Regulation (NSW) 2011
- Work Health & Safety (Mines and Petroleum Sites) Act 2013
- Work Health & Safety (Mines and Petroleum Sites) Regulation 2014.

ARTICLES, BOOKS AND REPORTS

- Forklift Safety Reducing the Risk, WorkSafe Victoria, 2011
- Front end loaders and their attachments on tractors, SafeWork NSW, February 2011
- Fork Lift Delivery drivers Guide, SafeWork NSW, October 1998
- Australian Standard Cranes, hoists and winches, Part 19: Telescopic Handlers, AS 1418.19 2007
- Australian Standard Cranes Hoists and Winches Safe use, Part 19: Telescopic Handlers, AS 2550.19 2007
- MDG 1010 Guidelines for Minerals Industry Safety and Health Risk Management, NSW Department of Industry, January 2011
- MDG 1014 Guide to reviewing a risk assessment of mine equipment and operations, NSW Department of Industry, July 1997
- Heavy Vehicle Driver Handbook, NSW Roads & Maritime Services
- Road Users Handbook, NSW Roads & Maritime Services
- Load Restraint Guideline, Second Edition, 2004.

APPENDIX 3: BOW TIE RISK ASSESSMENT



APPENDIX 4: SAMPLE LOAD SHIFT ASSESSMENT

End Users can utilise the range of questions listed below to develop a site specific Load Assessment Risk Form. This can be completed by a Load Shift Equipment Operator and the associated delivery driver.

GENERAL

- Has the delivery driver logged on / off, wearing PPE and is aware of site standards?
- Is the vehicle/trailer correctly positioned and level?
- Are vehicle chocks in place and the vehicle made fundamentally stable?
- Is there any damage to the vehicle/trailer?
- Have effective Safe Standing Zones is in place around the vehicle?
- Is the weight of the load known to the people involved?
- Are the appropriate people and equipment available for loading/unloading?

UNLOADING

- Has any freight moved in transit?
- Are all items effectively secured to a pallet, cradle or in a cage?
- Are top loaded items stable?
- Could any freight move, or become unstable, if the load restraint devices were removed?
- Could any freight move or become unstable when freight is being unloaded? E.g.; liquid in drum?

LOADING

- Is freight to be despatched clean, well packed and secured in cartons or appropriate packaging?
- Is the equipment being loaded clean with debris removed from trapped areas, has no oil /grease leaking?
- Is documentation, (con notes/manifest) completed for all cargo being dispatched?
- Are there any items that may have stored energy, e.g. springs under tension fitted with warning labels?
- Is the load restraint equipment suitable to safely restrain the load?
- Could any freight move or become unstable when freight is being loaded? E.g.; liquid in drum
- Does the total weight of the cargo exceed the vehicles carrying capacity or axle loadings?
- Are the load dimensions within the RMS limits?
- Is the load placed in a stable position and is it suitably restrained?

APPENDIX 5: SAMPLE DELIVERY DRIVER FAMILIARISATION TEMPLATE

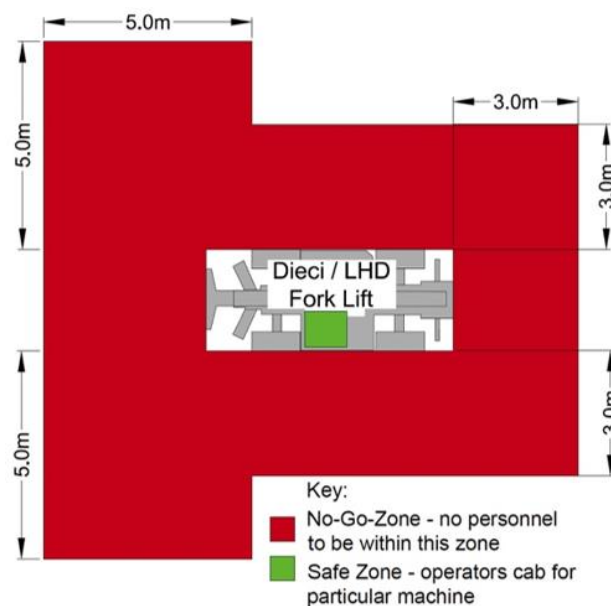
End Users can utilise the range of questions listed below to develop a site specific Delivery Driver Familiarisation Form. The Delivery Driver Familiarisation Form should be completed by an Authorised Representative, Load Shift Equipment Operator and the Delivery Driver.

The listed questions / statements will be utilised to provide Delivery Drivers with key instructions on the requirements when unloading goods.

GENERAL

- Has the delivery driver logged on / off, wearing PPE and is aware of site standards?
- Does the Delivery Driver agree to comply with [site] road rules, e.g. speed limits, give way to pedestrians?
- Has the Delivery Driver been shown or knows the location of the loading/unloading area?
- Is the Delivery Driver competent/confident to un-strap the load or tying down the load correctly and safely?
- The Delivery Driver will, when exiting the vehicle, be wary of any mine traffic in the area and stand clear.
- The Delivery Driver has been instructed and understands the Safe Standing Zones information sheet.
- The Delivery Driver is willing to obey the instructions of an authorised site responsible person whilst the unloading and loading process is taking place.

End users should develop a tool / system for the provision of information to delivery drivers when onsite. This instruction should incorporate a Safe Standing Zone Diagram. An example is shown below and can be referred to as a guide.



APPENDIX 6: GOODS HANDLING COMPLIANCE CHECKLIST

End Users can utilise the range of questions listed below to develop a site specific compliance verification checklist. The purpose of this exercise is to;

- Observe the **method** in which the task is carried out, and
- Assess the level of **compliance** with established standards as demonstrated by the workers involved in completing the task.

GENERAL

- Is there a documented standard/process for the activity?
- Has a pre-start risk assessment been completed?
- Have the delivery driver/transporter been provided formal instruction in the expectations of the standards?
- Have all workers involved in the activity received training in the standard and are they aware of the requirements?
- Is the correct equipment being used for the activity and is it fit for purpose?
- Has an effective safe standing zones been set up and includes a designated location for bystanders? Is the area marked out as identified?
- Has the load shift equipment operator been assessed as competent to undertake the activity (include relevant high risk licensing)
- Has a clear defined communication process been established between all those involved in the activity?
- Have the involved workers confirmed / inspected the load before / after packing / loading / transport of load?

PACKAGING

- Are strappings / wrapping as per standard
- Are required markings clearly visible?
- Is the quantity per bundle / stack as per manifest?
- Are bundles accessible and separated by appropriately placed dunnage?
- Is the packing label complete & accurate and fixed to the load?

LOADING / UNLOADING

- Has a pre-start risk assessment been undertaken?
- Is the safe standing zones being adequately enforced?
- Are safe standing zones markers / barricades being used effectively? (as required)
- Is Load Shift Equipment being used as designed and in line with relevant procedure?
- Is the placement of the load on the vehicle consistent with the required Standard?
- Is the size, dimension, configuration etc. consistent with the Standard?

- Is the load secure?
- Are there clear and defined communications between the workers undertaking the activity?

TRANSPORT TO SITE

- Is the transport vehicle appropriate and fit for purpose and road worthy?
- Is there any evidence that the load has been compromised during transport?

STORAGE

- Is the storage area clearly identifiable and marked out?
- Is the on-site storage standard being maintained?
- Is there clear and unobstructed access to the storage area
- Are housekeeping standards being maintained?
- Is the storage area ready to receive the load?
- Is there any unauthorised use of the storage area?

TRANSPORT ONSITE

- Is the correct transporter being used on-site?
- Is the transporter fit for purpose?
- Has the transporter been serviced and maintained in accordance with OEM specifications?
- Has the transporter operator been assessed as competent to operate the vehicle?
- Has the transporter been loaded correctly?
- Is the load secure prior to leaving the loading area?



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