

CHIEF DIRECTORATE OF OCCUPATIONAL HEALTH AND SAFETY

MAJOR HAZARD INSTALLATION CONFERENCE,

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Major Hazard Installation Regulations, 2022

Application

- Promulgated in November 2022
- Published and became implementable from 31 January 2023
- MHI Regulations, 2001 was repealed in 17 May 2023
- Scope of application
 - major hazard Installations
 - All Classes of MHI/Establishment
 - Prescribed Quantities (Annexure A, Chapter 1, 2 and 3)
 - Notes:
 - aggregation and 2% rule,
 - NH₄NO₃ (self-decomposition, fertilizer and technical Grade),
 - ...
- Exclusions
 - Class 1 of DG - Explosives (Ex Regulations + SAPS)
 - Nuclear Installations (DMR + NERSA)
 - MHI in transit (DoT, all modes, that includes CAA, RSR, MOSH, TNPA), etc.
 - Mining (MHSA)



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Major Hazard Installation Regulations, 2022

Approval of New Establishments

- This requirement is in the Local Government mandate
- Planning applicants for new establishments are required to submit a QRA to jurisdicative local municipality/metro
- Jurisdicative local municipality/metro must evaluate the submitted **QRA** before advising the Council on the acceptability
- Town Planning Section is enabled by NBR&BSA to approve plans in respect of section 4 of the said Act:

***Section 4(1):** prohibition of any person to start building without permission in writing*

***Section 4(3) (a)** contain the name and address of the applicant and, if the applicant is not the owner of the land on which the building in question is to be erected, of the owner of such land;.....*



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Major Hazard Installation Regulations, 2022

Approval of New Establishments

- **Section 4(3) (b):**

“.....be accompanied by such plans, specifications, documents and information as may be required by or under this Act, and by such particulars as may be required by the local authority in question for the carrying out of the objects and purposes of this Act.”

- **section 4(4)**

“Any person erecting any building in contravention of the provisions of subsection (1) shall be guilty of an offence and liable on conviction to a fine not exceeding R100 for each day on which he was engaged in so erecting such building”



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Major Hazard Installation Regulations, 2022

Approval of New Establishments

• BUILDING CONTROL OFFICER

- **Section 5 (1)**every local authority shall appointment of building control officer
- **Section 5(2)** When a fire protection plan is required in terms of this Act by the local authority, the building control officer concerned shall incorporate in his recommendations referred to in subsection (1)(a) a report of the person designated as the chief fire officer by such local authority, or of any other person to whom such duty has been assigned by such chief fire officer, and if such building control officer has also been designated as the chief fire officer concerned, he himself shall so report in such recommendations.
- **Section 5(3)(a)&(b)** : allows for a temporary appointment or borrowing of building control officers from other municipalities.
- **Section 6:** functions
- **Section 7 (1)(a):**..... application in question complies with the requirements of this Act and any other applicable law, ...



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Major Hazard Installation Regulations, 2022

Land Use Planning approach for New Establishments

- South African Land Use Approach : SPLUMA
- The Spatial Planning and Land Use Management Act 16 of 2013 intends:
 - to provide a framework for spatial planning and land use management in the Republic;
 - to specify the relationship between the spatial planning and the land use management system and other kinds of planning;
 - to provide for the inclusive, developmental, equitable and efficient spatial planning at the different spheres of government;
 - to provide a framework for the monitoring, coordination and review of the spatial planning and land use management system;
 - to provide a framework for policies, principles, norms and standards for spatial development planning and land use management;
 - to address past spatial and regulatory imbalances;
 - to promote greater consistency and uniformity in the application procedures and decision-making by authorities responsible for land use decisions and development applications;
 - to provide for the establishment, functions and operations of Municipal Planning Tribunals;
 - to provide for the facilitation and enforcement of land use and development measures; and
 - to provide for matters connected therewith.



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Major Hazard Installation Regulations, 2022

Land Use Planning approach for New Establishments

- Planning Section should also consult with the other sections including emergency services, electrical, environmental and etc. on any potential impact including the local access/egress arrangements in the context of availability of emergency resources and systems at the establishment including how the public will be notified of any event of an emergency.



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Major Hazard Installation Regulations, 2022

New Establishments

The regulations are immediately applicable and they should:

- demonstrate that they do present a tolerable risk of fatality to their current non-residential type neighbours and their nearest residential type property.
- Submit Form A + risk assessment + prescribed supporting documents to the LG to obtain buy-in.
- Submit an endorsed notification (Form A + proof of payment) to the Department for formal registration.



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RISK BASED ASSESSMENTS

1. LPG Installations

- the off-site risks for LPG storage will generally be dominated by large BLEVE events
- If there are several vessels of different size, which are at some distance apart, then the risks from each vessel should be **aggregated** and **2% rule** be applied
- Other events (such as VCEs and BLEVEs of a road tanker- when recharging the installation) may also be significant, and these should be included as part of the aggregation if they are considered to be credible events

Risk Based Approach

- Compliance with applicable legislations all applicable standards which include SANS 10087 and etc.
- SANS 10087 PART 3, defines LPG installation as a building



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RISK BASED ASSESSMENTS

LPG Installations

Risk Reduction Interventions

1. Fully mounding of LPG vessels

- If the LPG vessels are fully mounded (or buried) then the likelihood of a BLEVE becomes reduced, and the risk based zones should be based on a BLEVE of 50% of the full contents of the road tanker
- Consideration of VCE, the extent of the Inner Zone should be at least as large as the road tanker BLEVE fireball radius.

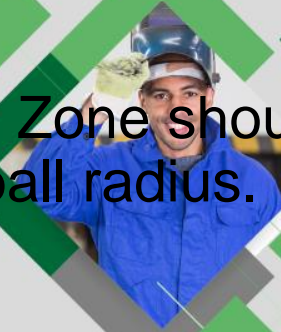
2. Coating of vessels

- if properly applied and maintained, this should significantly reduce the likelihood of a BLEVE



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RISK BASED ASSESSMENTS

2. LARGE SCALE FLAMMABLE STORES (with VCEs)

- significant risks associated with potential vapour cloud explosions (VCEs)

For example:

- gasoline (petrol) depots including the storage of petrol and its distribution from terminals to service stations
- vertical, cylindrical, non-refrigerated, above-ground storage tanks
- filling rates greater than 100 m³ /hour (this is approximately 75 tonnes/hour of gasoline)



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RISK BASED ASSESSMENTS

LARGE SCALE FLAMMABLE STORES (with VCEs)

Risk Based Approach

- The VCE event could be centred anywhere on site
- The magnitude of the overpressure generated by the VCE is defined as that arising from a 50,000 m³ VCE with an ignition strength of 7 and a combustion energy of 3.5 MJ/m³ using the **TNO** multi-energy method

(AIA: some are using the TNO software)

Consideration for:

- individual risks of fatality
- multiple vessels, it may sometimes be preferable to assume a lower frequency
- **risks** associated with large pool fires



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RISK BASED ASSESSMENTS

LARGE SCALE FLAMMABLE STORES (with VCES)

Potential for Risk Reduction

- For congested areas and where releases are likely to occur, such as loading bays, then the risk of VCEs in these areas should also be included in the risk assessment



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RISK BASED ASSESSMENTS

3. LARGE SCALE FLAMMABLE STORES (without VCEs)

- sites where the likelihood of a major VCE is considered to be low and can be negligible
- Associated risks:
 - major off-site risks are associated with large pool fires, following a loss of containment
 - worst case event is taken to be a circular pool fire located adjacent to the storage bund (i.e. due to bund overtopping or bund failure)
 - A pool fire which covers the entire surface of the bund



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RISK BASED ASSESSMENTS

LARGE SCALE FLAMMABLE STORES (without VCEs)

Risk Reduction Approach

- A major un-bunded pool fire extending up to 100 m from the bund wall
- A pool fire which covers the entire surface of the bund
- The levels of thermal radiation as a function of distance from the centre of the pool can be calculated using any standard pool fire model, in consideration of the wind direction as well



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RISK BASED ASSESSMENTS

LARGE SCALE FLAMMABLE STORES (without VCEs)

Potential Risk Reduction Measures

- compliance with current applicable legislations, standards and guidance
- if the material has a high flashpoint then the likelihood of a fire is reduced
- if the tanks are located in a large sunken bund, with little danger of overtopping, then it would be reasonable to adopt a lower frequency for large fires outside the bund
- If the topography of the area surrounding the bund has any special features, such as tertiary containment, then this could be accounted for by modifying the potential location of fires outside the bund



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RISK BASED ASSESSMENTS

4. FERTILISER BLENDING AND STORAGE SITES

- various grades of Ammonium Nitrate Fertilizer
- risks are associated with major fire, leading to a plume of toxic smoke which could travel for many kilometres, and the risk of an Ammonium Nitrate explosion.

Risk Based Approach

- Fire in vicinity of Ammonium Nitrate Fertilizer leading to the decomposition products Nitric Oxide and Nitrogen Dioxide being released.
- Explosion of molten/decomposing Ammonium Nitrate



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RISK BASED ASSESSMENTS

FERTILISER BLENDING AND STORAGE SITES

- **Potential Risk Reduction Measures**
- take into account the effect of being indoors
- use appropriate air change rates for the toxic hazards
- vulnerability relationships for the overpressure hazards



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RISK BASED ASSESSMENTS

5. WAREHOUSES

- Hazards
 - toxic substances (gases or volatile liquids),
 - plume of toxic smoke which could travel many kilometres.
 - thermal radiation effect

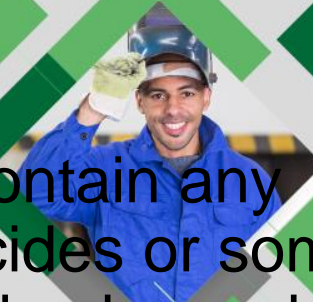
Risk Based Approach

- Assuming that the warehouse does not contain any particularly toxic materials, such as pesticides or some agrochemicals, capable of being released unburned in the fire plume, then the main risk will be associated with toxic combustion products



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RISK BASED ASSESSMENTS

WAREHOUSES

Risk Based Approach...cont..

- it is impossible to predict the precise mix and quantity of each toxic combustion product
- so the approach that needs to be adopted, is to assume that the toxicity of the fire plume can be represented by an equivalent release rate of the most significant toxic combustion product
- release of NO_x, HCl , SO_x, etc. depending on the chemical mix within the warehouse



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RISK BASED ASSESSMENTS

WAREHOUSES

Potential Risk Reduction Measures

- The release rate of NO_x , for example, can be estimated by assuming that 5% of the nitrogen content of the hazardous substances stored in the warehouse is combusted to form NO_x, and that this is released over 2 hours for a small warehouse, or 4 hours for a large warehouse.
- For warehouses storing a more complex mix of hazardous substances, a judgment will need to be made to determine the representative release rates of NO_x , HCl, SO_x and any other dominant toxic combustion product
- Etc.



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RISK BASED ASSESSMENTS

Reference:

Policy & Approach of the Health & Safety Authority to
COMAH Risk-based Land-use Planning (19 March 2010)



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RISK BASED ASSESSMENTS

EMERGING CHALLENGES

- MHI facilities which were classified under 2001, disappears without closure notices.
 - The infrastructure are dilapidated
- Mushrooming of LPG facilities
 - No compliance with SANS 10087, bogus installers, sale of refurbished tanks without client's knowledge, etc.
- There is confusion of Environmental Authorisation with LG Approval
- QRA seen as a compliance documents to MHI Regulations and other linking legislations. **THIS IS NOT CORRECT**
- Mushrooming of mobile petrol station
 - No compliance with SANS 10089



Way forward

Implementation:

- new MHI/establishments
 - immediately upon the Regulations being in force
- Existing MHI/establishments
- Phase 1: (31 January 2024)
 - 12 months
 - Emergency Plan
- Phase 2: (31 January 2025)
 - 24 months
 - Registration of MHI/establishment
- Phase 3 (31 January 2026)
 - 36 months
 - Technical Requirements



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Conference Commitments

- An Explanatory Notes to the Regulations is underway, once accepted by Council, it will become a public document. However, it is not legally binding as some facilities will always do better than the recommendations, but the Explanatory Notes is a working document and will be improved if new information/technology comes to light
- The team that developed the Explanatory Notes were fully represented from Organised Business, Organised Labour, Government, Associates and Experts from the MHI Industry.
- Collaboration with Local Government is developing positively and we will find common grounds to implement the MHI Regulations correctly without conflicts and repetition of Requirements
- We commit to continual engagements with MHI stakeholders and as such those with specific needs can contact us and request a one on one advocacy session.
- The method of engagement, date and venue should be communicated in time to allow the Department to plan and execute.
- All the presentations will be loaded on the Departmental website



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Thank You...



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