Rising to the Challenge

International Best Practices
in Storage Tank Firefighting

Storage Tank Fire Protection and Firefighting
Establishing New Ground
Meeting Industry Compliance for TYPE-II & TYPE-III
While delivering a Compliance +PLUS approach

OISD Seminar on Marketing Operations
New Delhi
Case histories that are reshaping industries approach to better managing storage tank fire fighting activities in a timely and work safe manner.

**Williams Case Histories**
1. Tenneco Chalmette
2. Norco Orion
3. Glenpool
4. Puerto Rico

**Industry Case Histories**
1. Idemitsu Kosan Tomakomai
2. CNPC Dalian
3. Trafalgar Pasir Gudang and Cilacap
4. Engen Cape Town

- Organization, Operation and Logistical fundamentals.
- Progressive technology changes that are reshaping and influencing storage tank fire protection and firefighting practices.
- Minimizing the environmental impact and investment losses.
No one’s extinguished more!

67 Tank Fire Responses in 33 years with more than 98 tanks successfully extinguished!
45m diameter Fully Involved Gasoline Storage Tank
Successfully Extinguishment with Mass Stream Application

Developments:

1. Open floating roof storage tanks do not have fixed fire protection systems to address full surface fires therefore manual intervention with Type-III application is required.

2. Newly applied “logistical methods” and “mass stream delivery” with the combined use of “1,000-gpm Hydro-Foam” nozzles and 3x6% AFFF/AR-AFFF foam concentrates.

3. No fire apparatus required for foam stream delivery as all equipment being portable and mobile.

4. The need for greater efficiency for firewater hydraulics.
Norco Orion
Norco Orion

Extinguishment achieved in 65-minutes from Foam Application

Excess of 23,000,000-lt (145,000-BBL) of reformulated Gasoline saved and recovered from tank post extinguishment
Norco Orion

82m diameter Fully Involved Gasoline Storage Tank
Successfully Extinguishment with mass stream Footprint Application

Developments:

1. Nearing 20-years of historically repeatable and proven use of manual intervention with Type-III applications to ensure control and extinguishment.

2. Increased “Application Rates” and “Dual High Volume” mass stream deliveries with high performance 3x6% AFFF/AR-AFFF foam concentrate.

3. The entire operation performed with “supplementary” firefighting equipment being fully transportable portable and mobile.

4. Large diameter firewater hydraulics.

5. “Cooling Water” where, when and when-not to be applied.

6. The need to Improve Logistical Capabilities.
Explorer Glenpool

44m diameter Fully Involved Gasoline Storage Tank
Successfully Extinguishment with mass stream Footprint Application

Developments:
1. Applied strategic Fire Plans together with Municipal Fire Department.
2. Applied usage of High Performance 1x3% AFFF/AR-AFFF foam concentrate.
3. Simplicity of “Logistics” and operational “Implementation”.
4. “Optimizing” available water and “Minimizing” usage due to applied Footprint application methods and extremely “High Performance” fire extinguishment foam concentrate applied @ 1%.
5. Minimizing environmental impact from both “airborne emissions” and “waste water” containment.
GULF Puerto Rico

2009
GULF Puerto Rico
(17x) 20 - 40m diameter Fully Involved Gasoline Storage Tank
Successfully Extinguishment with mass stream Footprint Application
Developments:
1. Applied strategic Fire Plans together with Municipal Fire Department.
2. Discontinue the use of multiple types of foam concentrate at the facility for a standardization for one High Performance AFFF/AR-AFFF foam concentrate.
3. Simplicity of “Logistics” and operational “Implementation”.
4. “Optimizing” available water and “Minimizing” usage due to applied Footprint application methods and extremely “High Performance” fire extinguishment foam concentrate applied @ 1%.
5. Minimizing environmental impact from both “airborne emissions” and “waste water” containment.
Flammable Liquid Firefighting

Knowledge

- Methodology
- Tactical Planning
- Scaled Training
- 3D Simulation
- Onsite Training
- Communication

- Fire Performance
- Proportioning Rate
- Application Rates
- Logistics
- Storage
- Deployment

Williams Fire Triangle

Performance
- Fire Equipment

Performance
- Extinguishing Agent
Engen Cape Town

2007
Engen Cape Town
Engen Cape Town
Engen Cape Town

(1x) 46m diameter Fully Involved Gasoline Storage Tank

Successfully Extinguishment however this tank was extinguished on Three-(3) separate occasion’s due to lack of Post Suppression following the first two attempts.

Developments:

1. Applied strategic Fire Plans with Footprint application.
2. Simplicity of “Logistics” and operational “Implementation”.
3. No one single performance foam concentrate as site maintained various brands and foam concentrate types of various shelf-life vintages.
   Standardization for one High Performance AFFF/AR-AFFF foam concentrate.
4. In consistent foam supply.
5. Post Suppressions measures not applied to prevent re-ignition.
6. Revision to Tactical Fire Planning, Logistics and Training.
Idemitsu Kosan
(1x) 44m diameter Fully Involved Naphtha Storage Tank

This storage tank burnt for nearly three days and was completely lost.

Developments:

1. Studies and investigation for the amendment of National Guidelines.

   - Improvement of Logistical Strategies.
   - Discontinued usage of fire apparatus for storage tank firefighting.
   - Implementation of mobile and transportable high volume equipment.
   - Implementation for new large diameter fire hose guidelines.
   - Implementation for new High Performance foam concentrate guidelines and introduction of multi-purpose 1% foam concentrates for storage tank firefighting applications.
   - Implementation for new Strategic Fire Planning and Training.
(2x) 80m diameter Fully Involved Crude Oil Storage Tanks
This storage tank burnt for nearly three days and was completely lost.

Developments:
1. Studies and investigation for the amendment of National Guidelines.
   • Improvement of Logistical Strategies.
   • Progressive movement away from fire apparatus for storage tank firefighting in particular tank diameters 60m and greater.
   • Implementation of mobile and transportable high volume equipment.
   • Implementation for new large diameter fire hose guidelines.
   • Implementation for new High Performance foam concentrate guidelines away from current 6% foam concentrates for storage tank firefighting.
   • Implementation for Educational Awareness and Training.
Trafalgar PG
2. Change of Management for Operational Procedures.
5. Changes to Procurement selection processes.
7. Changes to SOP’s and Training Practices.
8. Mutual Aid and Response Services Agreements.
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Thank you for your Participation

Michael Sorensen