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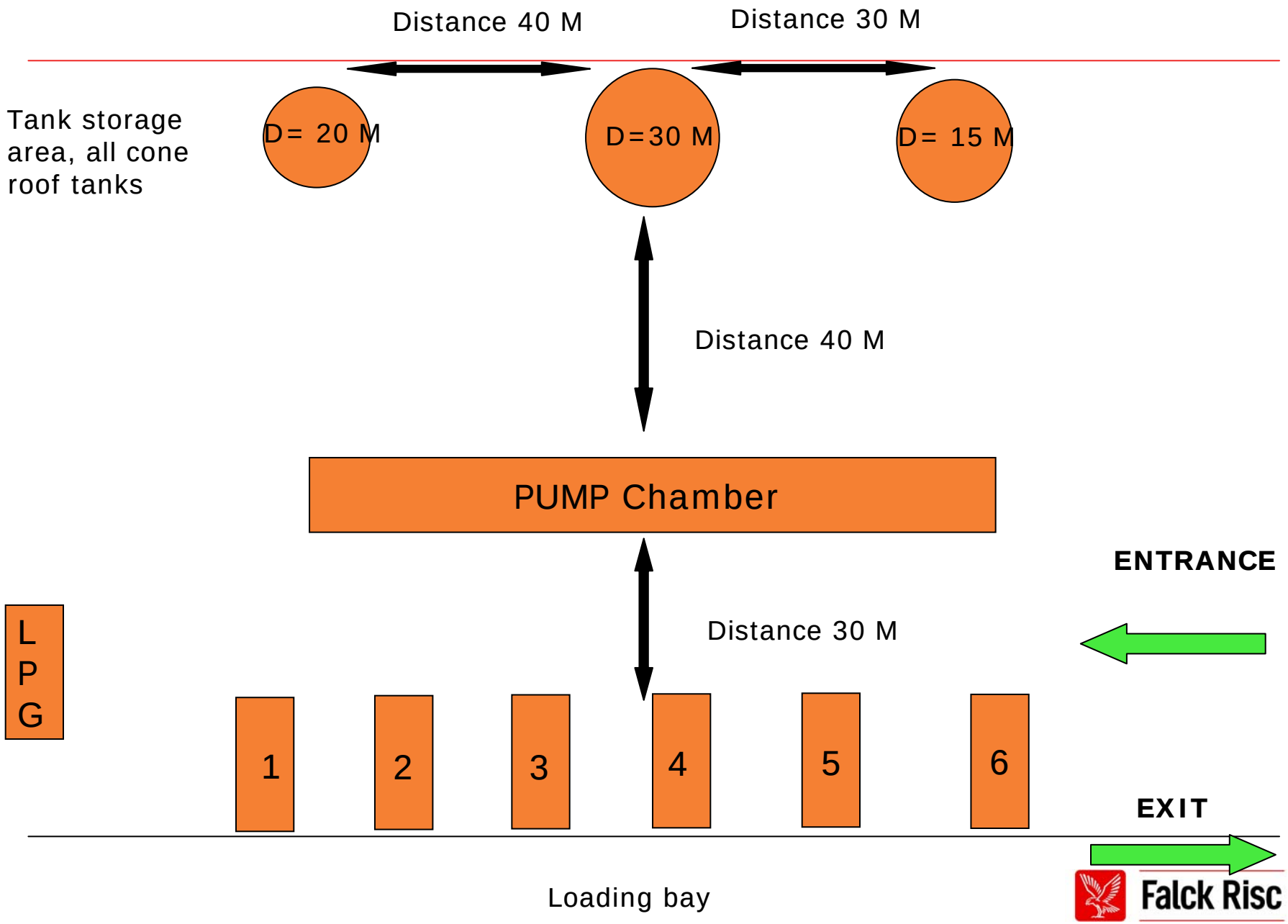
Workshop loading facilities


Distance 40 M
Distance 30 M
Tank storage area, all cone roof tanks
D= 20 M
D=30 M
D= 15 M
Distance 40 M
PUMP Chamber
ENTRANCE
L P G
Distance 30 M
1
2
3
4
5
6
EXIT
Loading bay
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Questions

1. Determine the possible scenario’s
2. Quantify the active fire fighting/safety measures and equipment
3. Quantify the passive fire fighting/safety measures and equipment
4. Quantify the total water capacity from the fire water pump house
5. Quantify the total foam stock

Determine the possible scenario's

- Leakages by loading from a truck
- Leakages from pump seals
- Overfill from tank or tank truck
- Vent fire on a tank
- Static electricity
- Tank internal fire
- Roof explosion
- Road tanker in fire
- Road tanker of the track hits one of the pumps in the pump area
- Accident between two trucks by leaving the loading bay

Quantify the active fire fighting/safety measures and equipment

- Loading procedures for tank and road tank loading
- Nitrogen blanked on the storage tanks
- Leak detection in de pump and loading area's
- Grounding storage tanks and loading trucks
- Gas detection pump area, Liquid en LPG loading area
- CCTV
- Automatically foam/water sprinklers liquid loading area
- Automatically water sprinklers LPG loading area
- Barrier in front of the pump area
- Traffic control and lights for the all the loading bays

Quantify the passive fire fighting / safety measures and equipment

- Fixed water monitors
- Fixed cooling installations on the cone roof tanks
- Fixed foam fire fighting installations for the storage tanks
- 50 Kg Dry Chemical powder extinguishers
- 9 Kg Dry Chemical powder extinghuishers
- Mobil water en foam monitors
- Training operators and truck drivers in basic’s of fire fighting

- Make a pre plan for this area

Calculations

First determine the worst scenario what can happen on this location. When we are looking to this area and the possible scenarios that will be a full surface fire after a a roof explosion on tank 2 with a diameter from 30 M.

That means a radiation threat for tank 2 and 3

Water calculation fro Cooling:

Tank 1 fixed cooling installation:

$1{,}5 \times D^2 = 1{,}5 \times 20^2 = 600$ l/min.

Tank 3 fixed cooling installation:

$1{,}5 \times D^2 = 1{,}5 \times 15^2 = 337{,}5$ l/min.

Note: we don,t have to cool the pump area because this is situated on the ground in the 2,5 KW/M^2 area.

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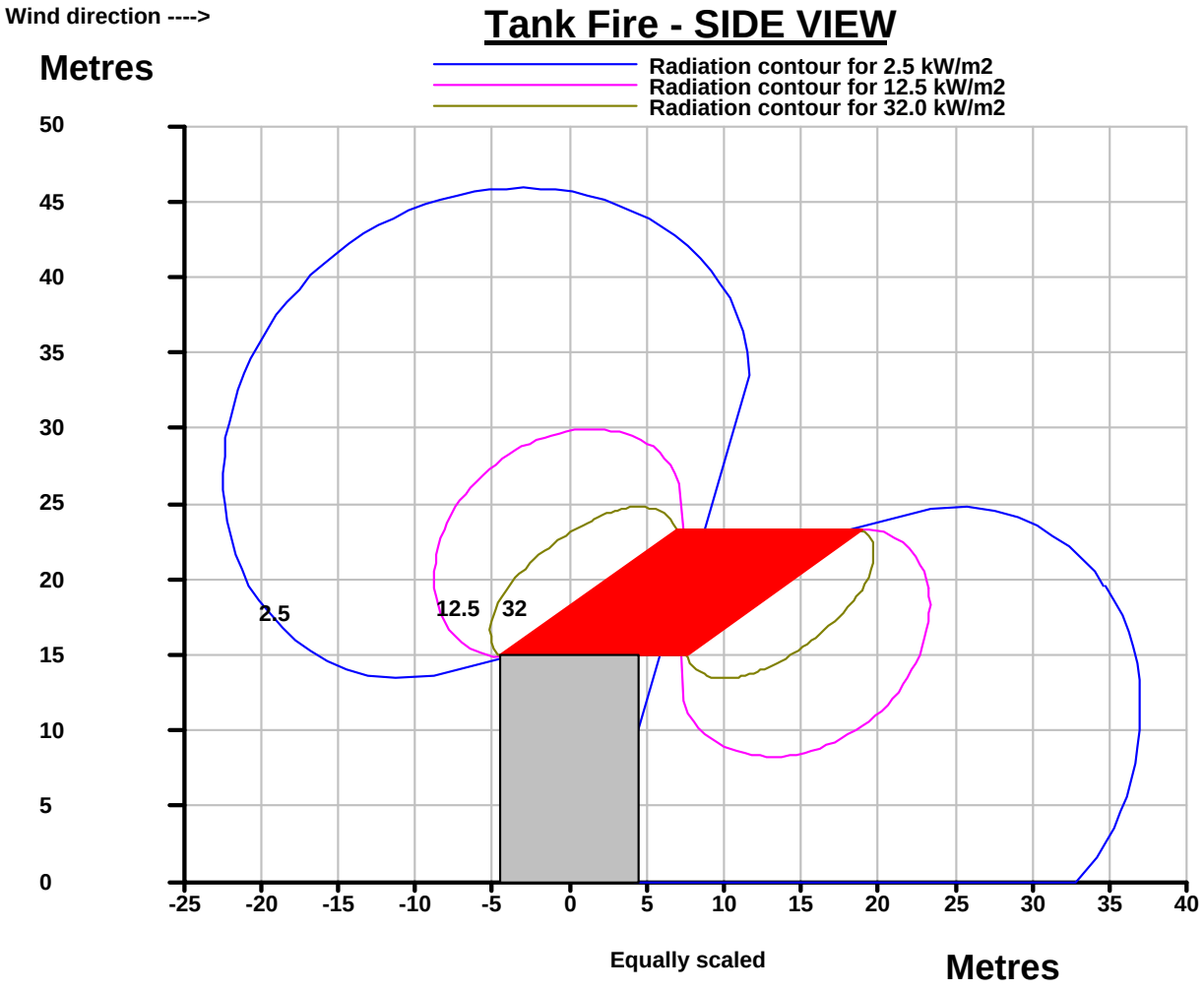
Example radiation on height



Burning liquid	Gasoline
Pool diameter (m)	9
Wind velocity (m/s)	5
Flame length (m)	14.1
Flame base length (m)	12.1

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Calculations

This means that we don’t can’t relay on the fixed system and prepare us for a attack with mobile equipment.

Tank 2 extinguishment with a mobile system:

$A = ¼ \times 3{,}14 \times D^2 = ¼ \times 3{,}14 \times 30^2 = 706{,}5\ M^2$

A X Application rate = 706,5 X 4,1 = 2896,55 l/min.

We using a mobile foam monitor with a capacity from 3200 l/min.

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Quantify the total water capacity from the fire water pump house

Total capacity fire pump house

Cooling tank 1	600 l/min.
Cooling tank 3	338 l/min.
Fire fighting tank 2	3200 l/min. +
Total	4138 l/min.

Total use per hour in M^3

$$\frac{4138 \times 60}{1000} = 248\ M^3/h$$ means a water pump from min. **250 M^3/h**

Quantify the total foam stock

Total foam stock

Use from a monitor 3200 l/min.

$$\frac{3200 \text{ X } 60 \text{ X } 3\%}{1000} = 5{,}76 \text{ M}^3$$ means a stock from min. **5,76 M³**