HAMS-GPS : Explosion Module

Data Entered

Reference No. : Ethyl mercaptan

Name of Chemical : Ethyl mercaptan-1

Scenario : Tank Mechanical Explosion due to external heating leading to BLEVE scenario

Cloud height at Pool/Dyke Depth from ground (m): : 2.19

Height of simulation (m): 1

TNT Equivalent of the chemical : 0.63

Explosion Mass (lbm) : 39.51

Explosion Type : Confined explosion

Results

Explosion Summary at Height of simulation (m) 1.00
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1. Cloud Radius (m): 1.19
2. Explosion Yield Factor: 0.10
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1. Storage tank/frameless structure damage limit (m): 11.28
2. 50% BrickWall damage distance limit (m): 13.41
3. Sheet/Panel damage limit (m): 35.36
4. Safe distance/Missile limit (m): 137.77

5. 100% Fatal distance (m): 3.05
6. 50% Fatal distance (m): 3.96
7. Fatal distance limit (m): 5.49
8. 100% Structural damage limit (m): 6.10
9. 50% Structural damage limit (m): 18.29
10. Structural damage limit (m): 46.33
11. Ear drum damage limit (m): 47.85
12. 100% Glass break limit (m): 23.77
13. 50% Glass break limit (m): 79.55
14. Glass break limit (m): 372.77
15. Loud noise (m): 375.82

Scenario : Tank Mechanical Explosion due to external heating leading to BLEVE scenario
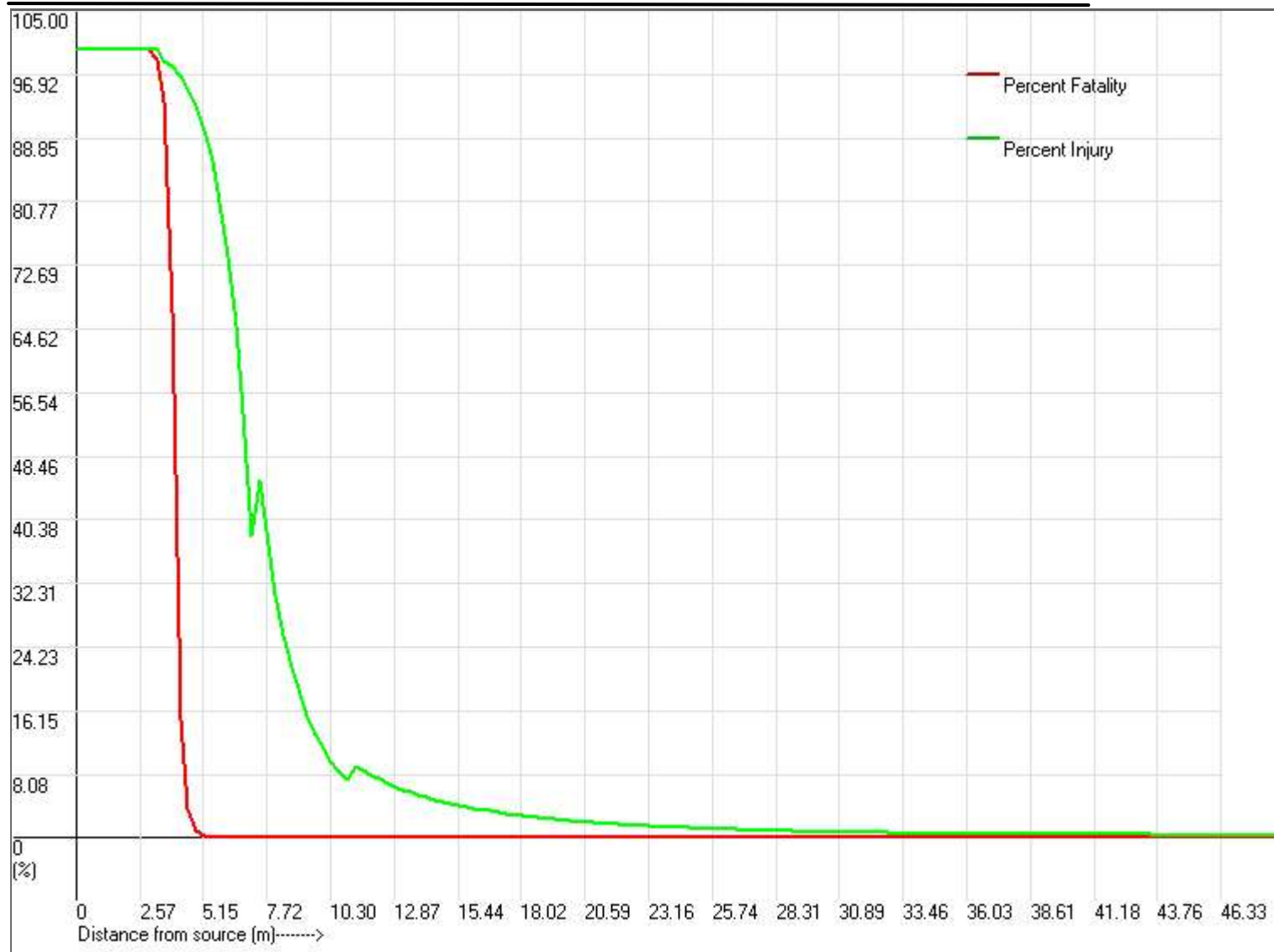
Probit Table and Absolute Fatality/Injury (At height of simulation 1 m)
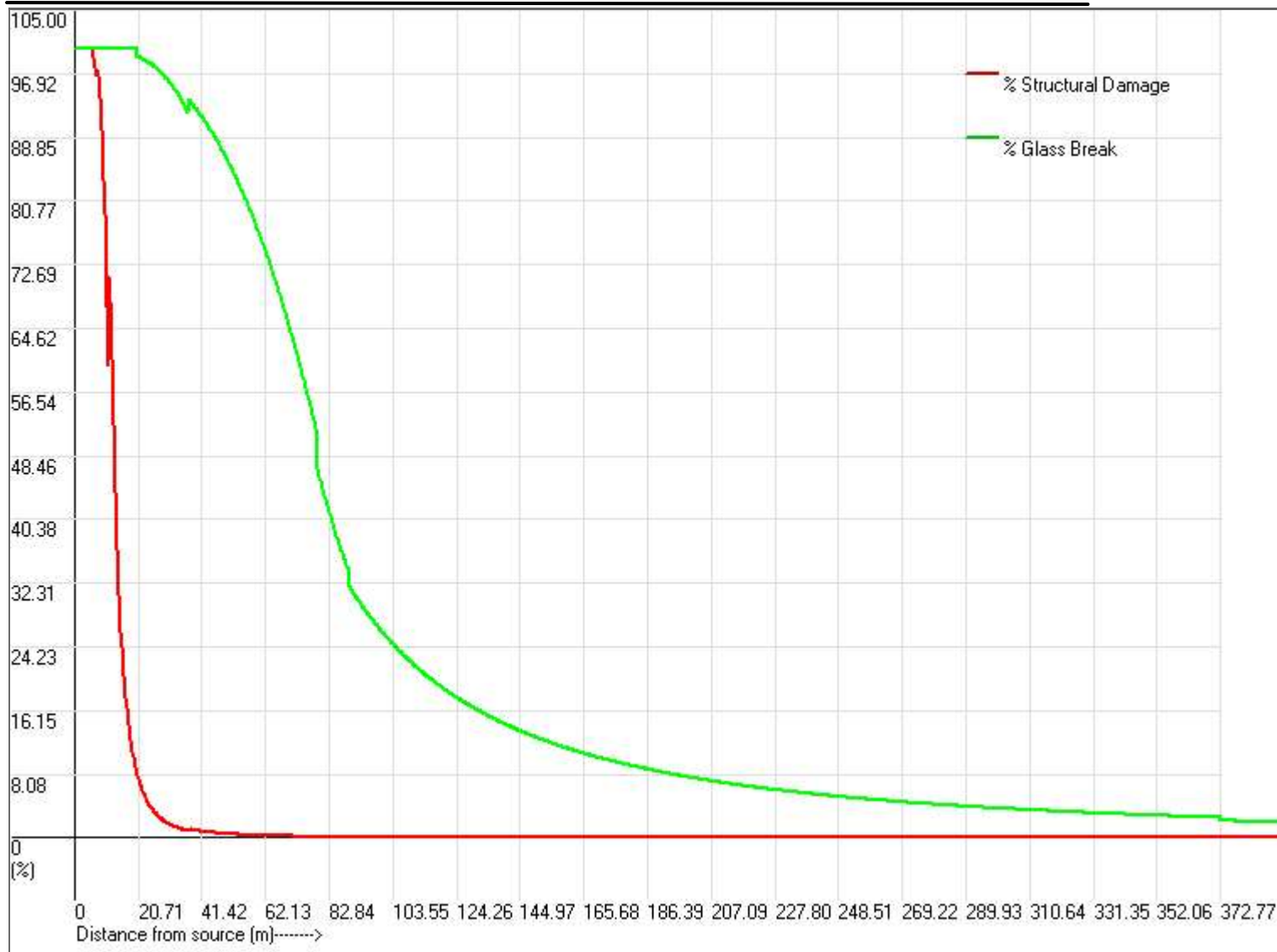
Wind orientation selected :1

Distance (m)	Over Pressure (psi) Invert	%Fatality Lung Rupture	% Ear Drum Rupture	% Structural Damage	% Glass Break	Area (Ha)	Absolute	
							Fatality No.	Injury No.
3.962	19.02	17.48	96.88	100.00	100.00	0.005	0.039	0.218
6.157	7.04	0.00	64.01	98.48	100.00	0.007	0.000	0.202
8.352	4.43	0.00	20.47	91.51	100.00	0.010	0.000	0.092
10.546	3.24	0.00	9.48	72.79	100.00	0.013	0.000	0.055
12.741	2.67	0.00	5.90	41.18	100.00	0.016	0.000	0.042
14.935	2.27	0.00	3.95	22.47	100.00	0.019	0.000	0.034
17.130	1.97	0.00	2.80	13.32	100.00	0.022	0.000	0.028
19.324	1.75	0.00	2.06	8.40	100.00	0.025	0.000	0.023
21.519	1.56	0.00	1.57	5.57	98.66	0.028	0.000	0.020
23.713	1.41	0.00	1.23	3.84	98.09	0.031	0.000	0.017
25.908	1.29	0.00	0.98	2.73	97.35	0.034	0.000	0.015
28.103	1.19	0.00	0.80	2.00	96.44	0.037	0.000	0.013
30.297	1.10	0.00	0.66	1.50	95.31	0.040	0.000	0.012
32.492	1.02	0.00	0.55	1.15	93.94	0.043	0.000	0.011
34.686	0.96	0.00	0.47	0.89	92.30	0.046	0.000	0.010
36.881	0.97	0.00	0.49	0.96	92.81	0.049	0.000	0.011
39.075	0.93	0.00	0.44	0.82	91.59	0.052	0.000	0.010
41.270	0.89	0.00	0.40	0.70	90.25	0.055	0.000	0.010
43.464	0.86	0.00	0.36	0.60	88.79	0.058	0.000	0.009
45.659	0.83	0.00	0.33	0.53	87.19	0.061	0.000	0.009

NOTE: Shock wave pressure is proportional to heat of combustion per Mole mass.

Scenario: Tank Mechanical Explosion due to external heating leading to BLEVE scenario

Fatality and Injury profile

Legend:
— Percent Fatality
— Percent Injury

Y-axis (%): 105.00, 96.92, 88.85, 80.77, 72.69, 64.62, 56.54, 48.46, 40.38, 32.31, 24.23, 16.15, 8.08, 0

X-axis — Distance from source (m)------->: 0, 2.57, 5.15, 7.72, 10.30, 12.87, 15.44, 18.02, 20.59, 23.16, 25.74, 28.31, 30.89, 33.46, 36.03, 38.61, 41.18, 43.76, 46.33

Scenario: Tank Mechanical Explosion due to external heating leading to BLEVE scenario

Structural Damage and Glass Break profile

Legend:
— % Structural Damage
— % Glass Break

Y-axis (%): 105.00, 96.92, 88.85, 80.77, 72.69, 64.62, 56.54, 48.46, 40.38, 32.31, 24.23, 16.15, 8.08, 0

X-axis — Distance from source (m)-------->: 0, 20.71, 41.42, 62.13, 82.84, 103.55, 124.26, 144.97, 165.68, 186.39, 207.09, 227.80, 248.51, 269.22, 289.93, 310.64, 331.35, 352.06, 372.77

Fatal distance limit (m): 5.49

Ear drum damage limit (m): 47.85

Structural damage limit (m): 46.33

Safe distance/Missile limit (m): 137

Glass break limit (m): 372.77

Gas Cloud center Height @ 3.38 m

Height of simulation @ 1

Ground Level

Effect dist. : 372.77 m

Effect dist. : 137.77 m

Effect dist. : 47.85 m

Source point ... 49 m

Fatal distance limit (m): 5.49

Ear drum damage limit (m): 47.85

Structural damage limit (m): 46.33

Safe distance/Missile limit (m): 137.77

Glass break limit (m): 372.77

HAMS-GPS : Explosion Model
Scenario: Tank Mechanical Explosion due to external heating leading to BLEVE scenario
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Oil Refinery
IOCL Panipat Refinery

SBI ATM
एसबीआई एटीएम

Effect dist. : 372.77 m

Effect dist. : 137.77 m

Effect dist. : 47.85 m
Effect dist. : 5.49 m

Panipat Refinery
Captive Power Plant
पानीपत रिफाइनरी
कैप्टिव पावर...

Fatal distance limit (m): 5.49

Ear drum damage limit (m): 47.85

Structural damage limit (m): 46.33

Safe distance/Missile limit (m): 137.77

Glass break limit (m): 372.77

Google

151.52 m

3D