



## Risk Analysis Management System Document

Client	Venue	Show Date	Show Time	Duration	Crowd Size
Doug Stack	Tolmers Scout Camp & Activity Centre, Tolmers Rd, Cuffley EN6 4JS	18/01/2025	21:00	8 Minutes	Approx. 250

Client Contact	Set to Music?	240v Power	Event Type
Doug	No	Venue	Scouts

### Contents:

- Site Plan & Layout
- Site Survey Notes
- Site Photographs
- Primary Risk Assessment
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- Insurance Documents
- One The Day Onsite Risk Assessment (be to completed by lead firer)

Assessor Name	Date	Time
Cris Matthews	15/01/2025	17:00

## Site Plan & Layout



Google Maps image captured 09/01/2024

## Site Survey Notes

- Display to take place in a clearing in the trees near Bert's Pool
- Audience should be a minimum of 100m upwind of the display
- A radius of 150m from the display should be kept clear of all tents etc...
- Strong winds are predicted, currently showing as blowing debris in to the trees behind the display, there has been a lot of rain recently and there should be no additional fire risk from debris falling within the forested area.
- Access is via a roadway that has soft spots along it, some matting has been laid along the route to aid with access

		S		
		Potential Severity of Harm		
		Slightly Harmful 1	Harmful 2	Extremely Harmful 3
L  Likelihood of Harm Occurring	Highly Unlikely 1	Trivial 1	Tolerable 2	Moderate 3
	Unlikely 2	Tolerable 2	Moderate 4	Substantial 6
	Likely 3	Moderate 3	Substantial 6	Intolerable 9

### Primary Risk Assessment

All activities will be operated in accordance with established Matthews Brothers Pyro Health & Safety Policy and Method Statements. This document identifies specific additional hazards, risks and any divergence from existing documented methods and risk control measures.

Group	Hazard and description of potential risk	Initial Risk			Actions to control the risk	Revised Risk			Action taken By Whom	When
		S	L	R		S	L	R		
Public	Local residents being disturbed by the noise of the firework display	1	2	2	The venue to inform local residents of show and start times. Local resident to take appropriate action.	1	1	1	Client	18/01/25
Public	Local animals being disturbed by the noise of the firework display.	2	2	4	The client to inform local residents of show and start times. Local residents to take appropriate action to safeguard their animals.	2	1	2	Client	18/01/25
Public	Wind direction blows debris and smoke in to the crowd causing discomfort and damage to clothing	2	3	6	MBP to review the site on the day of the show and consult weather forecast, review viewing area appropriate to wind direction.	2	1	2	MBP	18/01/25
Public	Potential of burning embers and debris falling onto member of the public and/or local property	3	3	9	Maintain maximum safety distances from the crowd and local members of the public, adjusting show content on the day based on local conditions. Firing positions to be placed a minimum of 1 metre for every mm of calibre.	3	1	3	MBP	18/01/25
Public	Possible public entering firing site and are harmed by live pyro	3	3	9	Client to place safety marshals in appropriate positions to ensure firing sites remain clear of public. Any potential of public encroaching marshals will issue a warning via radio contact to the lead firer who will stop the show	3	1	3	Client	18/01/25

Public	Premature ignition of items on firing site during unloading	3	2	6	Keep public separated from the unloading/transport routes and areas	3	1	3	MBP	18/01/25
Operators	Premature ignition of items on firing site during unloading	3	3	9	Only qualified and experienced pyro-technicians to handle material and equipment	3	1	3	MBP	18/01/25
Operators	Mass explosion of entire holding in transport vehicle resulting in onsite risk	3	2	6	Stock to remain in appropriate sealed UN rated transport cases at all times. To be stowed securely, ensuring stack heights do not allow major impacts. All electronic match wires to be shunted.	3	1	3	MBP	18/01/25
Public	Mass explosion of entire holding in transport vehicle resulting in onsite risk	3	2	6	Maintain safety distances to all members of the public. No access to any part of the firing site	3	1	3	MBP	18/01/25
All	Unexpected violet event from ignition due to incorrect Hazard Types	1	3	3	Ensure correct labelling of all boxes with clear instructions given and monitoring of site by lead firer	1	2	2	MBP	18/01/25
Operators	Ignition through poor handling of pyrotechnic articles	3	3	9	MBP safe working methods to be followed at all times and monitored by lead firer	3	1	3	MBP	18/01/25
Operators	Accidental ignition during unloading/loading	3	2	6	Restrict handling of pyrotechnic articles to qualified team members only	3	1	3	MBP	18/01/25
All	Premature ignition from any spark/smoke/flame source	3	2	6	All and any sources of ignition banned from work site. Strict No Smoking policy enforced	3	1	3	Client/MBP	18/01/25
Operators	Personal Injury arising from work carried out at the work site or during transportation	2	2	4	Correct PPE to be worn all times by all team members. Safe manual handling techniques to be employed. Steel capped ankle boots to be worn by all team members and trip hazards minimised.	2	1	2	MBP	18/01/25
Operators	Premature ignition of pyrotechnic article when adding electronic match, delay fuse or joining quick match.	2	3	6	Main fusing to be completed off site. All onsite fusing made in an open area following the MBP safe working practice document	2	2	4	MBP	18/01/25
Operators	Road transport of fireworks – Premature ignition	3	3	9	All legal and ADR requirements to be met by fully trained drivers as required. All licences to be checked for valid date by lead firer	3	1	3	MBP	18/01/25

Operators	Premature ignition of fireworks from stray RF, hot source, lightning strike or other method beyond MBP reasonable control	2	2	4	All electronic match wires to remain shunted until point of installation. Public access to be restricted from firing site. Works to halt in storm conditions	2	1	2	MBP	18/01/25
Operators	Premature ignition during loading and fusing of pyrotechnic articles	3	3	9	MBP safe working methods to be followed at all times and monitored by lead firer	3	1	3	MBP	18/01/25
Operators	Failure of pyrotechnic article leads to damage of racking/securing method leading to further failure or pyrotechnic articles	3	3	9	MBP safe working methods to be followed at all times and monitored by lead firer. Use of PyroQuip racking for aerial shells only. Safety distances to maximised.	3	1	3	MBP	18/01/25
Operators	Accident/ignition of pyrotechnic article during post show clear up and de-rig	3	3	9	15 minute safety window to be observed, as per MBP safe working practices, before lead firer returns to the firing site to fully inspect site. Live materials to be removed safely and stored in a sealed UN case. All fires and smoulders to be put out fully before de-rig commences. All waste to be boxed/bagged and loaded onto the vehicle last.	3	2	6	MBP	18/01/25
Operators	Personal Injury arising from working in low light levels	1	2	2	All crew members to wear head torches for they can work with both hands in low light conditions	1	1	1	MBP	18/01/25
Operators	Air borne pyrotechnic articles causing danger to aircraft	3	2	6	CAA to be notified if within notable distance. Lead firer to watch for local air traffic	3	1	3	MBP	18/01/25
Public	Smoke drift from show blowing over neighbouring roads causing impaired vision	2	2	4	Lead firer to monitor and test weather conditions and assess prior to firing the show	2	1	2	MBP	18/01/25
Operators /Client	Protestor attack leading to compromise of site safety	1	2	2	Site security to be maintained and monitored during show	1	1	1	Client/MBP	18/01/25
All	Covid pandemic restrictions to minimise spread of virus	2	1	2	All to follow all current government and venue covid policies	1	1	1	All	18/01/25

# Shellcalc Calculations

## ShellCalc@ v5.2.3

Essential Input Parameters		
Type	<b>Shells/Bombettes</b>	<i>select type from list</i>
Shell Diameter	<b>4" (100mm)</b>	<i>select calibre from list</i>
Firing angle	<b>0</b>	<i>° angle from vertical</i>
Tumbling/Mortar Drift	<b>Typical</b>	<i>select option from list</i>
Wind Speed	<b>27</b>	<i>km/h</i>
Relative Wind Direction	<b>30</b>	<i>° relative angle</i>

Optional Input Parameters (leave blank if unknown)		
Height of launch	<b>0</b>	<i>m from ground level</i>
Muzzle Velocity		<i>m/s - Not valid if SBH entered</i>
Fuse Delay		<i>s (99 to allow to hit ground)</i>
Shell Mass		<i>g</i>
Standard Shell Burst Height		<i>m (vertical fired - no wind)</i>
Shell Burst Diameter		<i>m</i>
Elevation of Launch Site	<b>300</b>	<i>m AMSL</i>

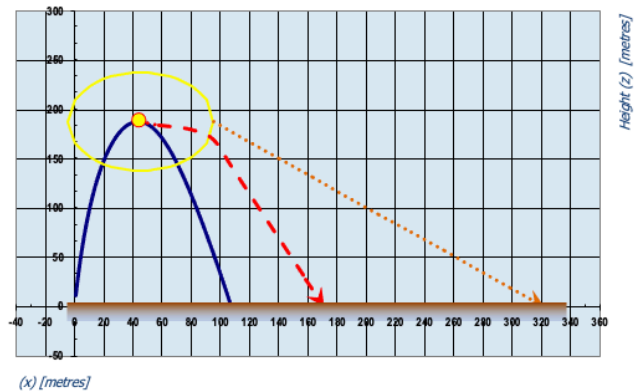
ShellCalc Program Options (Rarely used)		
Terrain Category	<b>2</b>	<i>(refer AS1170.2)</i>

Display Options		
Display "Normal" fallout?	<b>Yes</b>	<i>only valid for Shells</i>
Display "Long Burn" fallout?	<b>Yes</b>	<i>only valid for Shells</i>

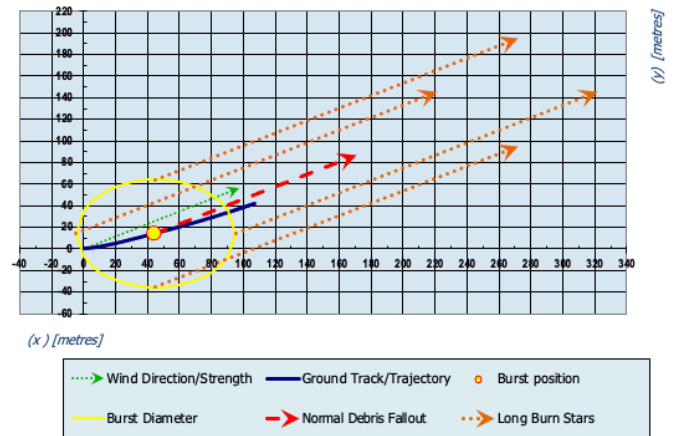
Calculated/Entered Output Values		
Max Height	<b>188</b>	<i>m from ground level (z)</i>
Normal fallout range (approx)	<b>192</b>	<i>m from origin (x/y)</i>
Long Burn range (approx)	<b>353</b>	<i>m from origin (x/y)</i>
Approx Burst Diameter	<b>100</b>	<i>m</i>
Ascent Time	<b>5.2</b>	<i>s</i>
Burst Time	<b>5.2</b>	<i>s</i>
Burst Distance (from firing point)	<b>45</b>	<i>m</i>
Burst Height (from Ground Level)	<b>188</b>	<i>m</i>
Max Downrange (Blind distance)	<b>115</b>	<i>m from origin (x/y)</i>
Flight Time (if shell does not burst)	<b>15.0</b>	<i>s</i>
Calculated Muzzle Velocity	<b>125</b>	<i>m/s</i>
Calculated Shell Mass	<b>407</b>	<i>g</i>

Developed by John Harradine, Manly, Queensland, Australia  
 Additions by Tom Smith, CamDu Ltd, UK - effective Sept 2013 (see revision log).  
 See <http://www.jpyro.com/wp?p=23> for more details  
 See Help TABS for more information

Predicted Trajectory [x/z plot]



Predicted Ground Track [x/y plot]



ShellCalc is an industry recognized algorithm used to estimate the flight of aerial shells. A worst-case scenario has been chosen for the site, with a reasonable wind blowing directly towards the viewing public or shortest safety distance. Calculations show that it is likely to find Normal debris up to 192m from the firing site whilst using the largest 4" (100mm) calibre shell used on the display. Safety distances to the public in the case of this display are a minimum of 100m for the largest Calibre to be used.

Should the wind speed, direction and conditions be different on the day/time of the display, then a further onsite risk assessment will be carried out by the lead firer to determine if the firing site needs to be relocated or product removed from the show.

# Weather Report

Potters Bar (Hertfordshire) 🔍

Nearest forecast to EN6 (United Kingdom)

Today

10°  
6°

Thu 16 Jan

8°  
4°

Fri 17 Jan

6°  
2°

**Sat 18 Jan**

4° 1°

☀️ Sunrise: 07:58 🌇 Sunset: 16:25

UV L Pollution L

Overcast.

Sun 19 Jan

4°  
1°

Mon 20 Jan

5°  
1°

Tue 21 Jan

5°  
1°

Saturday								Sunday	
00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	00:00	03:00
Weather symbols <span>🌧️</span>									
Chance of precipitation <span>&lt;5%</span>									
Temperature <span>°C</span>									
3°	2°	2°	2°	3°	3°	2°	2°	2°	1°
Feels like temperature (°C)									
1°	1°	1°	1°	1°	2°	1°	0°	0°	0°
Wind direction and speed <span>mph</span>									
▲ S 4	▲ S 3	▶ SSE 3	▶ SSE 3	▶ SSE 4	▶ SSE 4	▼ SE 4	▶ SSE 4	▲ S 4	▲ S 3
Wind gust (mph)									
12	11	11	13	13	12	12	12	11	11
Visibility <span>description</span>									
G	G	M	M	M	M	M	M	M	M
Humidity									
86%	87%	88%	87%	85%	84%	87%	89%	87%	86%
UV									
-	-	-	1	1	1	-	-	-	-

Updated: 17:12 (UTC) on Wed 15 Jan 2025

Show reduced forecast ⌵

Forecast table explained ℹ️

← LAST 24 HOURS

Weather Report taken 17:00 15/01/2025





### On The Day Onsite Risk Assessment

Lead Firer	Date of Assessment	Time of Assessment
Cris Matthews	18/01/2025	

Wind Direction	Wind Speed	Action Required ?

Observation	Action Taken	End Result

Signed	Time & Date