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Method Statement and Risk Assessment
7 Alleys

Version	**Version 1**	**Attached Documents**
Compiled By	**Paul Bryce**	• **Flambeaux woofer** • **Fireball** • **Artem smoke machine**
Event Location	**East Park, Hull. HU8 8JU**	
Event Date	**3rd-6th May 2017**	

Contents

Detail of event

The event is a piece of outdoor theatre by Periplum. It will include fireworks, stage and arena pyrotechnics, liquid fuelled fire, gas fuelled fire, smoke effects and gas powered confetti.

Most effects are designed to be used in close proximity to audience and performers. Some effects are larger and will be fired from within barriered areas.

The park is large and only part of the park will be used. This area will be closed to the public throughout setting up, until we leave after the final performance.

The event also uses horses. The horses will be introduced to the effects they are close to under controlled circumstances. Loud and startling effects will only be used once the horses are a suitable distance away. The horses and horse handlers have worked on such event before, however, the design of the show shall remain adaptable to allow for unpredictable behaviour of the horses.

Detail of security and health and safety regarding fireworks, pyrotechnics, fire and smoke, and firing sites shall come under the jurisdiction of the Firework Safety Officer appointed by lightfires. General security, health and safety, audience, guests and public welfare and road closure shall come under the jurisdiction of Periplum or the event management team.

Contact details

Name	Role	Telephone	Email
Paul Bryce	Firework Safety Officer	07940 621 721	paul@lightfires.co.uk
Frank Earle-Whiffen	Lightfires crew	07931 282 114	frank@earlesfireworks.co.uk

Crew ICE numbers are kept in the 'Crew' folder. If this is not on site a copy can be found in the office. 01634 787 324.

Nearest Accident and Emergency	Police Non-Emergency	CALOR Emergency Contact
Hull Royal Infirmary Anlaby Road Hull HU3 2JZ 01482 875 875	**101**	**08457 444 999**
	NHS Direct	**BOC Emergency Contact**
	111	**0800 111 333**

General

The design of the show is based on over 12 years of experience working with pyrotechnics. During the design process other experienced pyrotechnicians were consulted. This risk assessment was begun alongside the design such that they could be checked against each other throughout the design process.

Guidance has been taken from HSE publication 'Working together on firework displays' (HSG 123). This is a useful guide in terms of professional behaviour, best practice and general competence however it should be afforded a generous interpretation as it does not cover the specific effects used here.

The hazards included in the performance are Class 1 – Explosive, Class 2.1 – Flammable gas and Class 2.2 asphyxiating gas.

The explosive material chosen is in Category 1, 3 and 4 and Hazard Group 3 and 4. It is all of proven reliability from reputable suppliers.

All Fireworks are classified and authorised by the HSE and contained within a LOCAF (List Of Classified and Authorised Fireworks). This classification involves batch testing the effects for reliability and also prohibited explosive material.

All effects will be used within safety distances recognised by the manufacturers, the EIG and industry partners.

lightfires uses a show report before, during and after the show to record information. This report logs site conditions, suggestions from crew, notes on weather, changes to the schedule etc. and is used to improve future events.

Site plan

[TBC]

Summary of effects

Fireworks and Pyrotechnics

Fireworks used shall be a mixture of Cat 1, CAT3 and CAT4 fireworks from hazard group 3 and 4. Material is chosen to suit the site and safety distances available. It will therefore mostly be made up of low calibre, low debris material. Some larger aerial effects will be fired from isolated firing sites away from the performance area. Fireworks shall be rigged using proven methods, by staking into the ground, by attaching to metal frames and then staking to the ground, fixed in place by sand bag. Smaller effects may be handheld by trained performers. All crew shall be aware of the nature of each effect, and the point at which it is to be lit during the show. All crew shall be trained to identify a misfire or any other untoward behaviour of the fireworks and have an idea of what preventative measures to take and how to respond to a misfire. Fallout and safety distances vary greatly, attention should be paid to the list of material. Aerial effects contain only stars, no units, therefore any fallout will not explode on the ground, only a small safety zone around the fallout area is necessary. All safety distances shall be adequate in the professional judgment of all on site crew. Please also see Wind Management Plan regarding safety distance.

Material	Manufacturer	Safety Distance (M)	Description
Fuse/Pipematch	Shellscape	4M	A black powder fuse normally used to ignite fireworks, used here to add crackle and sparks.
Waterfall/cascade	Wells	3M performer (larger for audience –consider wind drift)	Close proximity effect projects fountain of cool burning sparks with no debris. Lasts 20 seconds.
Maroon	Wells	3M performer with ear defenders (6M audience)	Produces a loud percussive bang. 105Db at 1M
Red handheld flare	Pains Wessex	Handheld	Red distress flares emits very bright red light and smoke.
White handheld flare	Pains Wessex	Handheld	White distress flares emits very bright white light and smoke.
Lance	Shellscape	1M	A miniature flare emits a bright white light.
Turning Gerbes	Kimbolton	2m performer (Larger for audience –consider wind drift)	Used to spin horizontally. Produces a swirling cascade of hot sparks.
Stage gerbe	Wells	Handheld (for audience – consider wind drift)	Projects a spray of cold burning sparks
Comet	Shellscape/Wells	25M/5M	Ejects a single bight star followed by a glittering tail.
Crackers	Kimbolton	3M performer / 6m audience.	Produces a series of loud bangs.
Blinker bengal	Wells	1M performer / 3M audience	Bengal flares, white strobing, creating a 100mm very hot flame.

Mine	Wells	5M	Ejects multiple stars to 20M.

Flame effects

The flambeaux are a metal structures consisting of a long pole with inverted cone at the top. They may be free standing or securely attached to railings, benches etc. A large wax candle is then placed inside the cone. The candles are approximately 100mm diameter and 120mm tall and burn with a flame about 150mm high. Their duration is around 4 hours depending on wind, environmental temperature etc. The can does get hot but can easily be handled with gloves. Some smoke is produced but no debris. They will be extinguished using fire blanket or allowed to burn out. Much smoke may be produced on extinguishing the candles. Where this is a concern they can be grouped together and a fire-blanket put over them, in most cases this will significantly cut down the amount of smoke.

Fire rope is rigged in vertical lines and window shapes outlining an alley way leading away from the audience. A fibreglass rope fuelled with an oil based fuel and covered in layflat plastic is securely attached to a metal framework. The rope is lit from a small pyrotechnic fuse. In its initial burn the plastic and some residue may drip, sand can be placed under at the base to stop the spread of fire. The flames burn at a height of approximately 300mm for around 10 minutes, with no debris. Some smoke is produced. Safety distance suggested is a nominal estimate which should be increased to at least the height of the structure.

Firebrands will be used performers to light some effects. They have a wooden handle, a metal shaft and fibreglass wadding secured to the end. They will be fuelled with a small amount of paraffin. They will be placed away from audience reach. After use they will taken to a safe area and extinguished with fire blanket or allowed to burn out.

Flambeaux woofers: See attached document.

Fireball: See attached document.

Material	Manufacturer	Safety Distance (M)	Description
Flambeaux	lightfires	Arms reach	Was based fuel, flame height 100-150mm duration 4 hour
Vertical fire lines	lightfires	2M or height of structure	Oil based fuelled fire, flame height 100-300mm, duration 10 mins
Window fire drawing	lightfires	2M or height of structure	Oil based fuelled fire, flame height 100-300mm, duration 10 mins
Firebrand	lightfires	Handheld	Oil based fuelled fire, flame height 100-300mm, duration 10 mins

Flambeaux woofer	Lightfires – Calor	Arms reach	LPG fuelled flame effect, produced a 500mm high 150mm wide flame. Can be triggered to fire a blast arounf 2500mm high250mm wide for a short duration.
Fireball	Lightfires – Calor	5M	LPG fuelled flame effect. Produces a fireball around 2500mm diameter lit by electronic spark ignition.

Smoke and other effects

Smoke will be produced using smoke grenades commonly used in paintballing. They are designed to be used with minimal training and experience. They are ignited by pulling a drawstring. They produce smoke for around 90 seconds. Normally they will be dropped on the ground, but a wooden handle can be added to make them handheld. They will not be thrown.

Artem smoke machine: See attached document.

One large CO_2 powered Blower containing paper flutter-fetti will be installed and operated by lightfires crew. It is powered by 1 x LK size carbon dioxide bottle. The flutter-fetti travels a considerable distance. Exact positioning of the blower will be dependant on wind strength and direction, the blower may be mounted on a large cart and moved through the audience. CO_2 will not be stored indoors.

Helium balloons will be filled onsite. Helium will not be stored indoors or used to make voices squeaky.

Material	**Manufacturer**	**Safety Distance (M)**	**Description**
White smoke grenade	Enola Gaye	Handheld/arms reach	Generates thick white smoke for around 90 seconds.
Artem smoke machine	Artem	Handheld	Generates thick white smoke at user discretion.
CO2	BOC	2M	Used to power confetti blower
Helium	BOC	N/a	Used in helium balloons

Fire Fighting Equipment

Lightfires shall supply the following equipment:

- Water fire extinguisher
- CO2 extinguisher
- Sand Bucket
- Fireblanket
- First aid kit

All crew will be given PPE appropriate for the tasks they will perform. Any defective PPE should be isolated from use and reported to the Firework Safety Officer. PPE might include:

- Gloves
- Goggles or face mask
- Ear defenders
- High Visibility vest/jacket

Crew will be asked to provide their own footwear with toe protection and waterproof/warm work clothes. Clothing should be made of natural fibres

Storage and preparation

Fireworks shall arrive on site prepared. No fusing should be necessary on site. Any necessary storage on site shall be kept to the minimum possible and placed in a secure vehicle. This is likely to be fusing materials used only in the case of repair to very minor damage and materials for later performances. Access to the vehicle will be limited to persons appointed by the Firework Safety Officer. All hazardous materials and articles will be stored in the correct certified and labelled packaging and only removed from the vehicle at the point of being rigged. A fire extinguisher point shall be sited an appropriate distance from the vehicle during rigging.

Stewarding and security arrangements

Stewarding and security arrangements fall under the jurisdiction of Periplum or the event management team. The Firework Safety Officer shall require confirmation that all public cordons are in place prior to working with hazards. The Firework Safety Officer shall also require secure loading/unloading and parking area from time of arrival to departure.

Environmental conditions and curtailment or cancellation procedure

Careful attention shall be paid to the weather conditions, in particular the wind, leading up to the performance. Test fires may be carried out, safety distance amended, any or all effects may be cut from the show, show design including site layout may be changed. The time of firing may be changed to anticipate better weather. This decision rests with the Firework Safety Officer who may consult metrological data, other experience crew, Periplum, the event management team, and Health and Safety Officers. However, the decision of the Firework Safety Officer shall be final and wholly unbiased.

It will be necessary to judge the wind conditions at the time of firing. Please see the Wind Management Plan. After the firing of pyrotechnic material, and use of smoke effects attention shall be given to any smoke that is not dispersed by the wind. Should smoke gather in such a way as to hinder vehicular traffic the emergency services shall be called.

Show Stop Procedure and Communications

Throughout the show two-way radios with noise cancelling headsets will be used for communication between members of lightfires crew and for communication between lightfires and Event Management. Radios will be supplied by the Event Management, from when lightfires arrive on site until the site is declared safe by the Firework Safety Officer.

Lightfires crew will be positioned to observe the firing of pyrotechnics. Should an issue occur, any crew member can call a halt to the show via two-way radios with noise cancelling headsets. A separate radio channel should be reserved for this communication.

The shows will be fired by a crew member who has received training to use the systems.

Crew Competence

The performance will be fired by a crew members who have received specific training to use the controls, and who have experience handling the hazards involved. Lightfires keeps training records of all crew and encourages individuals to increase their competences. Lead crew members all crew hold City & Guilds BPA (British Pyrotechnist Association) qualification for the firing of pyrotechnics and a First Aid at Work certificate.

Rubbish Disposal

All live material not fired or misfired during the show shall be packaged into UN approved packaging after each show. These boxes shall be stored in a secure vehicle and removed from site at the end of the event.

The bulk quantities of non-hazardous material e.g. paper waste, spent cardboard cartridges etc. shall be collected into bags and disposed of in a skip or suitable bin on site, provided by the event management.

Although most effects are debris free some small fragments of paper/card/foil may be scattered by wind. This should present no hazard to life or limb but some small environmental contamination.

Wind Management Plan

Wind shall be measured by anemometer, or observing the Beaufort wind force scale. This wind management plan shall be followed along side any risk assessment and may necessitate a dynamic risk assessment being written.

Beaufort number	Description	Wind speed	Land conditions	Action
0	Calm	<1 km/h, <1 mph, <0.3 m/s	Calm. Smoke rises vertically.	Observe smoke and wind direction around vehicular traffic.
1	Light air	1.1–5.5 km/h, 1–3 mph, 0.3–1.5 m/s	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.	As Above
2	Light breeze	5.6–11 km/h, 4–7 mph, 1.6–3.4 m/s	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.	None
3	Gentle breeze	12–19 km/h, 8–12 mph, 3.5–5.4 m/s	Leaves and small twigs constantly moving, light flags extended.	Consider gerbes and waterfall regarding wind direction.
4	Moderate breeze	20–28 km/h, 13–17 mph, 5.5–7.9 m/s	Dust and loose paper raised. Small branches begin to move.	Consider increasing distance between audience and performance area.
5	Fresh breeze	29–38 km/h, 18–24 mph, 8.0–10.7 m/s	Branches of a moderate size move. Small trees in leaf begin to sway.	As above, also, try to ensure nothing is free to be blown on the wind, consider test of effects for suitability in wind, possibly cut any effects.
6	Strong breeze	39–49 km/h, 25–30 mph, 10.8–13.8 m/s	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.	As above, also, consider cancelling show.
7	High wind, moderate gale	50–61 km/h, 31–38 mph, 13.9–17.1 m/s	Whole trees in motion. Effort needed to walk against the wind.	Cancel Show

Risk Assessment Key

		Severity					
		Multiple Death 10	**Single Death 8**	**Major Injury 6**	**3 Day Injury 4**	**Minor Injury 2**	**Trivial or None 1**
Likelihood	**Certain 10**	**100**	**80**	**60**	**40**	**20**	**10**
	Very Likely 8	**80**	**64**	**48**	**32**	**16**	**8**
	Probable 6	**60**	**48**	**36**	**24**	**12**	**6**
	Possible 4	**40**	**32**	**24**	**16**	**8**	**4**
	Unlikely 2	**20**	**16**	**12**	**8**	**4**	**2**
	Very Unlikely 1	**10**	**8**	**6**	**4**	**2**	**1**

Definition of Likelihoods

Certain 10	Has happened before and is expected to happen on this occasion.
Very Likely 8	Has happened before and is likely to happen on this occasion.
Probable 6	Has been known to occur and is likely to happen on this occasion.
Possible 4	Has been known to occur before and it may happen on this occasion.
Unlikely 2	Has been known to happen before but no reason to suggest that it will happen on this occasion.
Very Unlikely 1	Has never happened before and there is no reason to suggest that it will happen on this occasion.
Impossible 0	Has never happened before and could not happen on this occasion.

Residual Risk

Score	**Definition**	**Residual Risk**
25 to 100	Level of risk is unacceptable	HIGH
13 to 24	Level of risk may be tolerable, seek to reduce level of risk	MEDIUM
1 to 12	Level of risk is acceptable	LOW
0	No risk identified	NONE

Risk Assessment Contents

Pyrotechnics

1.1 Risk of explosion during transportation
1.2 Risk of explosion during loading or unloading
1.3 Risk of explosion to stored pyrotechnics
1.4 Risk of premature explosion during rigging of pyrotechnics
1.5 Risk of injury from misfire
1.6 Risk of injury from fallout
1.7 Risk of injury from pyrotechnics coming free
1.8 Risk of injury during derigging
1.9 Risk of adverse conditions effecting behaviour of pyrotechnics or pyrotechnic site

Fuel

2.1 Risk of fire during transportation
2.2 Risk of fire during loading or unloading
2.3 Risk of fire to stored flammables
2.4 Risk of premature fire during rigging
2.5 Risk of injury from misfire
2.6 Risk of injury from fallout
2.7 Risk of injury from flammable material coming free
2.8 Risk of injury during derigging
2.9 Risk of adverse conditions effecting behaviour of flammable materials or pyrotechnic site

Smoke machine and Confetti Blower

3.1 Risk of burn caused by extreme temperatures of smoke machine or confetti blower.

Working on site

4.1 Risk of injury caused by on site vehicle movement
4.2 Risk of injury caused by electric shock
4.3 Risk of injury from tools
4.4 Access and egress of crew, performer and public
4.5 Risk of damage to buildings etc. and environment
4.6 Risk of smoke hindering pedestrian/vehicular traffic
4.7 Protection of environment and containment of waste materials

Dynamic Risk Assessment

Risk Assessment

	Hazard	To Whom	Severity without control	Likelihood without control	Risk without control	Control	Severity with control	Likelihood with control	Residual Risk
1.1	Risk of explosion during transportation.	Crew, Public	10	4	40	Transport of explosives will be carried out by experienced pyrotechnicians who are aware of the hazard and will ensure that there are no sources of ignition in the vicinity. Where necessary drivers to be ADR qualified. Vehicle and driver to adhere to regulations for the transportation of explosives. All explosives to be stored in UN approved packaging. Containers are packed in such a way as to ensure they will not topple, fall or slide in transit. In the event of premature ignition during transit, the vehicle will be brought to a halt in as safer manner as possible and all personnel will evacuate the vehicle. Emergency services shall always be called in this circumstance. Foam and powder fire extinguishers, will travel in the vehicle.	10	1	10 (LOW)
1.2	Risk of explosion during loading or unloading.	Crew, Public	10	4	40	All unloading will take place within the designated area. All explosive to be stored in UN approved packaging. Do not lift more than you can safely carry. Route between storage area and vehicle to be checked prior to commencing loading or unloading. Signage and cordons will be erected as necessary. No smoking allowed on site during unloading / loading. Fire extinguishers to be sited in working compound on arrival.	10	1	10 (LOW)
1.3	Risk of explosion to stored pyrotechnics.	Crew, Performers, Public	10	4	40	All explosive to be stored in UN approved packaging. Containers are packed in such a way as to ensure they will not topple, fall or slide in storage. Signage and cordons will be erected as necessary. No smoking, naked flames, sparks allowed within the vicinity of stored pyrotechnics. Fire extinguishers shall be sited in vicinity of the storage area. Bulk storage to be kept separate from rigging area.	10	1	10 (LOW)
1.4	Risk of premature explosion during rigging of pyrotechnics	Crew, Performers, Public	10	4	40	All handling and rigging carried by experienced pyrotechnicians. Public excluded from the rigging area. Signage and cordons will be erected as necessary. No smoking, naked flames, sparks allowed within the vicinity of pyrotechnics.	10	1	10 (LOW)

						Appropriate fire extinguishers, fire blankets, water buckets to be within the vicinity of rigging. Pyrotechnics protected with foil or fire-blanket to prevent premature ignition. Firing systems to have arm keys and/or power sources removed during rigging. Bulk storage to be kept separate from rigging area.			
1.5	Risk of injury from misfire	Crew, Performers	6	4	24	All effects are securely rigged and operated by experienced pyrotechnicians. All crew and performers will be aware of the expected behaviour of the material and how and when it is fired. Crew will be equipped with appropriate PPE. Effect operator and assisting crew or performers will have constant visual contact with the effects and can immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. Effects and performers positions shall be decided with consideration of each other. Material sited at sufficient distance from audience that in the event of a misfire the blast will not reach any members of the public. No unessential personnel in firing sites. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. All material used is of proven reliability and is authorised by the HSE. Material in close proximity to people is low calibre and is designed to be fired in close proximity to people. All bulk storage will be removed from the firing site in good time before firing. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.	6	1	6 (LOW)
1.6	Risk of injury from fallout	Crew, Performers, Public	2	6	12	Crew and performers will be provided with appropriate PPE. All handling and rigging carried by experienced pyrotechnicians. Effect operator and assisting crew or performers will have constant visual contact with the effects and can immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. No unessential personnel in firing sites. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. Effects must be sited at a sufficient distance from audience. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.	2	1	2 (LOW)
1.7	Risk of pyrotechnics coming free	Crew, Performers, public	8	4	32	Crew and performers will be provided with appropriate PPE. All handling and rigging carried by experienced pyrotechnicians. Effect operator and assisting crew or performers will have constant visual contact with the effects and can immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. No unessential personnel in firing sites. All equipment used should be visually checked for faults and discarded if found or suspected faulty. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. Effects must be sited at a sufficient distance from audience. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.	8	1	8 (LOW)
1.8	Risk of injury	Crew	8	4	32	Crew and will be provided with appropriate PPE.	8	1	8

	when derigging					All crew will be aware of the behaviour of the material and how and when it is fired. Only essential personnel on site Appropriate fire extinguishers, fire blankets, water buckets to be on site during derigging. A suitable period of time shall be allowed to elapse in order to allow pyrotechnic material to cool before derigging shall begin.			(LOW)
1.9	Risk of adverse conditions effecting behaviour of pyrotechnics or pyrotechnic site	Crew, Performers, Public	8	4	32	All exclusion areas are to be suitably cordoned and/or stewarded to ensure no public access. Firer to have constant visual contact with effects and audience so that that where possible an effect can be halted if public were to enter exclusion areas. Weather and environmental conditions to be monitored periodically throughout the day. Access and egress to be inspected by Firework Safety Officer. Provision of First Aid to public to be inspected by Firework Safety Officer Some or all material may be cut if deemed unsafe by the Firework Safety Officer. The final decision to cut material rests with the Firework Safety Officer.	8	1	8 (LOW)
2.1	Risk of fire during transportation	Crew, Public	10	2	20	Transport of flammable liquids and gases will be carried out by experienced pyrotechnicians who are aware of the hazards and will ensure that there are no sources of ignition in the vicinity. Liquids are and gases will be stored in packaging constructed for this purpose, and labelled appropriately. Containers are packed in such a way as to ensure they will not topple, fall or slide in transit. In the event of premature ignition during transit, the vehicle will be brought to a halt in as safer manner as possible and all personnel will evacuate the vehicle. Emergency services shall always be called in this circumstance. Foam and powder fire extinguishers, will travel in the vehicle. Any oil spills will be covered in sand. Any alcohol spills will be covered in sand, foam or powder, watered down, or cordoned off and allowed to safely evaporate. Cylinder labels are attached to all BOC and Calor cylinders. The label is produced in accordance with the current legislation, and you must never remove or deface these labels. If a leak is suspected, park the vehicle in a safe place and contact BOC or Calor and emergency services.	10	1	10 (LOW)
2.2	Risk of fire during loading or unloading	Crew, Performers, Public	10	2	20	All unloading will take place within the designated area. Liquids are and gases will be stored in packaging constructed for this purpose, and labelled appropriately. Do not lift more than you can safely carry. Route between storage area and vehicle to be checked prior to commencing loading or unloading. Signage and cordons will be erected as necessary. No smoking allowed on site during unloading / loading. Fire extinguishers to be sited in working compound on arrival. Any oil spills will be covered in sand. Any alcohol spills will be covered in sand, foam or powder, watered down, or cordoned off and allowed to safely evaporate. Cylinder labels are attached to all BOC and Calor cylinders. The label is produced in accordance with the current legislation, and you must never remove or deface these labels. If a leak is suspected, park the vehicle in a safe place and contact BOC or Calor and Emergency Services.	10	1	10 (LOW)

2.3	Risk of fire to stored flammables	Crew, Performers, Public	10	2	20	Liquids and gases will be stored in packaging constructed for this purpose, and labelled appropriately. Containers are packed in such a way as to ensure they will not topple, fall or slide in storage. Signage and cordons will be erected as necessary. No smoking, naked flames, sparks allowed within the vicinity of stored flammables. Fire extinguishers shall be sited in vicinity of the storage area. Bulk storage to be kept separate from rigging area. Any oil spills will be covered in sand. Any alcohol spills will be covered in sand, foam or powder, watered down, or cordoned off and allowed to safely evaporate. Bulk gas storage is to have adequate ventilation such that a leak will spread too thinly to cause ignition or asphyxiation. Cylinder labels are attached to all BOC and Calor cylinders. The label is produced in accordance with the current legislation, and you must never remove or deface these labels. If a leak is suspected, park the vehicle in a safe place and contact BOC or Calor and Emergency Services.	10	1	10 (LOW)
2.4	Risk of premature fire during rigging	Crew, Performers	6	4	24	All handling and rigging carried by experienced pyrotechnicians. Public excluded from the rigging area. Signage and cordons will be erected as necessary. No smoking, naked flames, sparks allowed within the vicinity of flammables. Appropriate fire extinguishers, fire blankets, water buckets to be within the vicinity of rigging. Flammables protected with foil or fire blanket to prevent premature ignition where possible. Firing systems to have arm keys and/or power sources removed during rigging. Bulk storage to be kept separate from rigging area.	6	1	6 (LOW)
2.5	Risk of injury from misfire	Crew, Performers, Public	10	2	20	All effects are securely rigged and operated by experienced pyrotechnicians. All crew and performers will be aware of the expected behaviour of the material and how and when it is fired. Crew will be equipped with appropriate PPE. Effect operator and assisting crew or performers will have constant visual contact with the effects and can immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. Effects and performers positions shall be decided with consideration of each other. Material sited at sufficient distance from audience that in the event of a misfire the blast will not reach any members of the public. No unessential personnel on site. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. All material used is of proven reliability. All bulk storage will be removed from the firing site in good time before firing. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.	10	1	10 (LOW)
2.6	Risk of injury from fallout	Crew, Performers, Public	3	6	18	Crew and performers will be provided with appropriate PPE. All handling and rigging carried by experienced pyrotechnicians. Effect operator and assisting crew or performers will have constant visual contact with the effects and can	3	4	12 (LOW)

						immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. No unessential personnel in firing sites. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. Effects must be sited at a sufficient distance from audience. Fallout will occur in the form of ash or sparks and is therefore most likely to injure the eye. Flammable materials and wicks etc. will be chosen for their low fallout properties. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.			
2.7	Risk of injury from flammable material coming free	Crew, Performers, Public	4	4	16	Crew and performers will be provided with appropriate PPE. All handling and rigging carried by experienced pyrotechnicians. Effect operator and assisting crew or performers will have constant visual contact with the effects and can immediately halt or extinguish the effect or show, Or request the operator to halt the effect or show. No unessential personnel in firing sites. All equipment used should be visually checked for faults and discarded if found or suspected faulty. Appropriate fire extinguishers, fire blankets, water buckets to be on site during the show. Effects must be sited at a sufficient distance from audience. The weather, in particular the wind conditions, will be monitored throughout the day and changes made to the relative positions of public, performers, crew and effects as necessary.	4	1	4 (LOW)
2.8	Risk of injury during derigging	Crew	8	4	32	Crew will be provided with appropriate PPE. All crew and performers will be aware of the expected behaviour of the material and how and when it is fired. Only essential personnel on site. Appropriate fire extinguishers, fire blankets, water buckets to be on site during derigging. A suitable period of time shall be allowed to elapse in order to allow structures and materials to cool before derigging shall begin.	8	1	8 (LOW)
2.9	Risk of adverse conditions effecting behaviour of flammable materials or pyrotechnic site	Crew, Performers, Public	8	4	32	All exclusion areas are to be suitably cordoned and/or stewarded to ensure no public access. Firer to have constant visual contact with effects and audience so that if possible an effect can be halted if public were to enter exclusion areas. Weather and environmental conditions to be monitored periodically throughout the day. Access and egress to be inspected by Firework Safety Officer. Provision of First Aid to Public to be inspected by Firework Safety Officer Some or all material may be cut if deemed unsafe by the Firework Safety Officer. The final decision to cut material rests with the Firework Safety Officer.	8	1	8 (LOW)
3.1	Risk of burn caused by extreme temperatures of smoke machine or confetti blower.	Crew, Performers, Public	6	4	24	Crew to be trained in the safe operation of effects. Gloves to be worn when carrying Artem smoke machine. Glove to be worn when operating confetti blower. Public kept a suitable distance from any hot or cold parts. Portable smoke machine to be preset and left within cordoned area away from public reach.	6	1	6 (LOW)
4.1	Risk of injury	Crew,	8	2	16	All vehicles moving on site will have their hazard lights on and adhere to a speed restriction of ‘Dead Slow’.	8	1	8

	caused by on site vehicle movement	Performer, Public				Only essential vehicles to move around the site at permitted times. A banksman in high visibility clothing will be used to escort vehicles at any times deemed necessary.			(LOW)
4.2	Risk of injury caused by electric shock	Crew, Performer, Public	8	4	32	All special effects to be fired by battery (12, 24V or 60V). Any electrical equipment used must be in good working order with current testing certificates. Electrical equipment found not in good order or damaged in use shall be disconnected from any supply, labelled as faulty and isolated from future use. Any Power demand will have been accurately calculated and the correct spec of power and distribution will have been sourced.	8	1	8 (LOW)
4.3	Risk of injury from tools	Crew	8	2	16	Any electrical equipment used must be in good working order with current testing certificates. Electrical equipment found not in good order or damaged in use shall be disconnected from any supply, labelled as faulty and isolated from future use. Tools shall only be used if considered fit for use by the user. Crew shall wear appropriate PPE when using sharps, mechanical or electrical tools.	8	1	8 (LOW)
4.4	Access and egress of crew, performer and public	Crew, Performer, Public	8	6	48	All exclusion areas are to be signed, suitably cordoned and/or stewarded to ensure no public access. Effect operators are to have constant visual contact with effects and audience so that that an effect can be halted if public were to enter exclusion areas. Crew and performers to be given an understanding of the nature of effects and there expected behaviour. Access and egress to be inspected by Firework Safety Officer.	8	1	8 (LOW)
4.5	Risk of damage to buildings etc. and environment	Public	N/a	4	N/a	All rigging will be conducted by experienced crew. There will be no drilling or fixings into pavements or walls. There will be no load bearings on any buildings. Fire extinguishers will be positioned on site. The weather, in particular the wind conditions, will be monitored throughout the day and changes made as necessary. Debris from effects and fireworks will consist of small pieces of paper and cardboard, with minimal chemical residue as the chemical composition will have burnt up. The use of plastic components will be avoided where possible. All flame effects will be placed at a safe distance from any structure or tree. If there is concern over proximity a test will be carried out with close monitoring of the flames to ensure they will not reach any sensitive structure. Fire extinguishers will be on hand with crew trained to use them. Whenever lit, the flame effects will be under constant supervision from crew.	N/a	4	N/a
4.6	Risk of smoke hindering pedestrian/vehicular traffic	Public	10	4	40	Crew and Production Management shall observe the direction of wind/smoke during the show. Local radio may be requested to alert drivers to the problem. Emergency services shall be informed.	10	1	10 (LOW)
4.7	Protection of environment and containment of	Public	10	4	40	Trained crew will clear the sites of all unspent pyrotechnic material. The whole fallout area will be checked for unspent pyrotechnic material. Any remaining fragments will biodegrade within a short time.	10	2	20 (MED)

	waste materials					Following the event any live material will be processed and re-sealed into appropriate packaging (UN box) marked 'Live' and removed from site. The bulk quantities of non-hazardous spent material and debris will be collected into bags and deposited in appropriate refuse on site.			

Dynamic Risk Assessment

Carried out by	
Date	

	Hazard	To Whom	Severity without control	Likelihood without control	Risk without control	Control	Severity with control	Likelihood with control	Residual Risk
5.0									