

**The Government of the Hong Kong  
Special Administrative Region**

**Code of Practice  
on the  
Use, Storage and Conveyance  
of  
Special Effects Materials**

## **Preface**

Explosives and pyrotechnical materials are a set of unique and highly powerful tool in modern technology. Because of their versatility, many brilliant visual and audible special effects and even some impossible stunts can now be made possible at reasonable cost. On the other hand, because of their devastating power, they can be deadly when handled carelessly.

The aim of this Code is to outline the safety procedures that should be followed in handling special effects materials. It is hoped that by observing these codes of practice, the potential harm to all who are directly or indirectly involved can be reduced.

In drafting and updating this Code, the author has made reference to many international standards, regulations and guidelines, including the Canadian Pyrotechnic Special Effects Manual, the Australian Standard AS 2187, relevant Guidance Notes published by the Health and Safety Executive in the United Kingdom, and the US NFPA Codes 495, 1123, 1124 and 1126.

Thanks are due to my colleagues in the Special Effects Licensing Unit for suggesting many useful comments and corrections on this and previous editions over the years. Special thanks are due to Mr Jim Allen of the Allan Hancock College in the United States who made very valuable comments to the draft version of the Code before it was first published in 2001. To make the Code up-to-date and to meet the operational need of the local industry, comments from the special effects industry are most welcome. Please send your comments and suggestions to : [esela@createhk.gov.hk](mailto:esela@createhk.gov.hk).

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## **1. Scope**

**1.1** The use of special effects materials for special effects in entertainment programmes (including films, TV productions, concerts and theatrical performances) is regulated under the Entertainment Special Effects Ordinance (Cap. 560), which is administered by the Entertainment Special Effects Licensing Authority (the Authority). Special effects materials are subdivided into two groups: pyrotechnic special effects materials and non-pyrotechnic special effects materials. The Ordinance also regulates the storage and conveyance of pyrotechnic special effects materials. The storage and conveyance of non-pyrotechnic materials are controlled under the Dangerous Goods Ordinance and the Gas Safety Ordinance, but for small quantities they are exempted from the licensing requirements.

**1.2** The purpose of this Code of Practice is to clarify the obligations of the special effects operators, production companies and other relevant persons with regard to the use, storage and conveyance of special effects materials. It also provides guidance for good practice so as to ensure that any person or any property is, as far as is reasonably practicable, protected from any personal injury or unintentional damage arising from the use of any special effects materials.

**1.3** In this document, the term “pyrotechnic materials” is abbreviated to “pyrotechnic special effects materials” for simplicity. In the context of this document, these two terms are interchangeable.

**1.4** The use of liquefied petroleum gas (LPG), the most common non-pyrotechnic materials for flame effects, will be dealt with in another code (CP2) issued by this Authority.

## **2. Using Special Effects Materials under a Stream A Discharge Permit**

### **2.1 Introduction**

**2.1.1** Pursuant to Schedule 1 of the Entertainment Special Effects (General) Regulation (the Regulation), use of special effects materials for the production of entertainment special effects is classified into two streams. This section deals with the use of special effects materials under a Stream A discharge permit. A Stream A discharge permit is issued for the production of special effects in films, commercials, television episodes and programmes (excluding any stage or similar productions performed before a proximate audience) and other similar productions. The use of special effects materials under a Stream B discharge permit will be dealt with in Section 3.

**2.1.2** The operator-in-charge referred to in this section means the Special Effects Operator named in a discharge permit issued under section 11 of the Ordinance.

**2.1.3** Section 11 of the Regulation stipulates that a discharge permit is not required for the discharge of non-pyrotechnic special effects materials under certain conditions. Nevertheless, the guidance given in this section is still relevant to such discharge, and any reference to the operator-in-charge should then refer to the special effects operator(s) responsible for the special effects.

### **2.2 General Obligation**

**2.2.1** Safety of the public, performers, special effects operators and support personnel is the prime consideration in all events involving the use of special effects materials. In order to ensure the safety of all concerned, the operator-in-charge named in a discharge permit has the final decision in all matters pertaining to the discharge of the special effects materials.

**2.2.2** If unforeseen hazards develop with regard to the people concerned, properties, weather conditions, the firing venue or the special effects materials, the operator-in-charge and his assistants have the responsibility to stop the production of a particular special effect or all special effects until safety is restored, regardless of the pressure from the production personnel, performers or other sources.

**2.2.3** Although the operator-in-charge is responsible for the use of special effects materials, including the final decision to discharge, under section 29(4) of the Ordinance, the Authority, the police and any officer referred to in section 29(1) of the Ordinance may prevent or stop the use of special effects materials when the circumstances under which such use is determined by him to be likely to endanger life or cause serious injury to property.

**2.2.4** Notwithstanding any discharge permit issued by the Authority, before the production of special effects on any premises, the production company shall obtain permission from the owner/agent/management of the premises. In case of filming in a vessel, the permission of the master or person in charge of the vessel shall be obtained. The operator-in-charge responsible for the use of the special effects materials shall verify with the production company that such permission has been duly obtained prior to using the materials.

**2.2.5** The production company shall give sufficient advance notice and details of the intended special effects to the operator-in-charge to allow him to safely plan the special effects. If significant changes are made to these plans, then additional time must be provided to safely accommodate the changes.

**2.2.6** The production company shall allocate sufficient time for the operator-in-charge and his assistants to safely perform their work including the conveying, storing, assembling, firing and disposing of all special effects materials. While handling such materials, they shall not be interrupted or distracted by the production company from focusing on their work, and shall never be pressured to hurry.

**2.2.7** The production company shall obtain permissions from the management/owner/agent of the premises and/or relevant government departments for the temporary closure of affected areas and/or temporary lane closure, if such areas are likely to be affected by the special effects.

**2.2.8** The production company shall authorise and cooperate with the operator-in-charge to prevent unauthorised persons gaining access to the discharge areas, until completion of firing and the operator-in-charge has determined the area to be safe and secure.

**2.2.9** The production company and the operator-in-charge shall provide

effective personal protective equipment and/or maintain sufficient separation distances from the special effects, so as to ensure the safety of all people including the performers, stunt performers, camera crew and other support personnel.

**2.2.10** The production company and the operator-in-charge shall take effective measures to reduce or remove nuisance caused by the discharge of special effects materials.

**2.2.11** The production company and the operator-in-charge shall observe the Employment Ordinance (Cap. 57) with respect to the employment of children aged below 15.

**2.2.12** The production company and the operator-in-charge shall provide first aid facility at the firing venue not less than those specified in the Occupational Safety and Health Ordinance (Cap. 509).

**2.2.13** The production company and all special effects operators shall ensure that there is no breach of the Dangerous Goods Ordinance (Cap. 295) and its subsidiary legislation with respect to the use, storage and conveyance of non-pyrotechnic materials.

**2.2.14** The production company and all special effects operators shall ensure that there is no breach of the Gas Safety Ordinance (Cap. 51) and its subsidiary legislation with respect to the storage and conveyance of liquefied petroleum gas (LPG), and shall observe additional requirements for the safe use of LPG which are given in the Code of Practice on the Use of LPG for the Production of Special Effects (CP2).

## **2.3 General Safety Requirements**

**2.3.1** For special effects events of small scale or low risk, the operator-in-charge shall undertake or engage an experienced person to undertake a risk assessment for all the activities under his control. The control measures identified in the risk assessment shall be communicated to the production company and all those concerned for implementation prior to any special effects activities. In general, control measures may include –

- (i) personal protective equipment (PPE);

- (ii) determination of safe distances;
- (iii) controls against noise, blast and radiated heat;
- (iv) control of debris, toxic effects and spread of fire;
- (v) emergency arrangement for dealing with events that do not go according to plan;
- (vi) misfires.

**2.3.2** For special effects events of large scale or high risk, the operator-in-charge shall undertake or engage an experienced person to undertake a full risk assessment. Reference should be made to para. 3.3.3 below.

**2.3.3** No special effects operators shall use special effects materials while under the influence of intoxicating beverages, alcohol, narcotics, prescription or non-prescription drugs or other substances that can impair judgement or movement. The operator-in-charge has the responsibility of ensuring his assistants to comply with this requirement.

**2.3.4** The production company shall ensure that any platform, pit or opening, or any container containing a scalding, corrosive or poisonous substance located within a set or shooting location must be fenced to a height of 900 mm or where it is not fenced, is sufficiently well protected.

**2.3.5** If the set is inside an enclosure, the production company shall ensure that the area is adequately ventilated by fresh air.

**2.3.6** The production company and the operator-in-charge shall ensure that the set is sufficiently well lighted by natural or artificial lighting during the handling and installation of special effects materials.

**2.3.7** The production company shall install at the set effective means for draining the set if any activity may make the floor of the set wet or slippery.

**2.3.8** No pyrotechnic materials shall be left unattended.

**2.3.9** Mobile telephones, radio transmitters and other devices that may cause accidental initiation of any pyrotechnic materials shall be kept away from the pyrotechnic materials as far as practicable. The risk of accidental initiation of pyrotechnic materials will much depend upon the strength and frequency of radio

frequency field of the transmitter and the antenna configuration formed by the leg wires or circuit wires connected to the pyrotechnic materials. The operator-in-charge shall search for and identify any devices or sources of radio waves in a firing venue, and confirm that these will not affect the pyrotechnic materials to be used in the area. As a general rule, mobile telephones shall be switched off at least within 3.5 m of the pyrotechnic materials.

## **2.4 Fire Protection and Precautions**

**2.4.1** While special effects materials are being used, the operator-in-charge shall ensure that -

- (i) at least two fire extinguishers appropriate to the types of special effects materials used are readily available and located within 15 m of the materials, unless specified otherwise in a discharge permit;
- (ii) all fire hoses and additional fire extinguishing equipment as required by the Authority are in working order and readily accessible; and
- (iii) personnel who have a working knowledge of the use of the above fire extinguishing equipment are present at all times while the special effects materials are being used or removed.

**2.4.2** The operator-in-charge and his assistants shall ensure that smoking is not permitted within at least 7.6 m of the area where special effects materials are used. The operator-in-charge may, if he considers it safe, allow smoking by performers as part of the act. The operator-in-charge shall ensure signs bearing the words “不准吸煙” and “No Smoking” are posted in suitable locations as close to the special effects materials as practicable.

**2.4.3** The production company and the operator-in-charge shall maintain the set where special effects materials are used in a neat and orderly condition, and free of any fire nuisance that can create a fire hazard.

**2.4.4** When the set is in use for shooting, the production company shall keep all doors that provide egress from the set for shooting unlocked or are otherwise fastened in such a manner that they can easily be opened from inside the set. A clearly visible sign bearing the words “出口” and “EXIT” must be located at each exit from the set. Such signs may be temporarily removed as necessary when the set appears on camera but must be promptly replaced when filming of that

set is completed. Cleared areas for emergency exits must not be blocked by persons or other equipment.

**2.4.5** The production company shall provide a clearly visible sign bearing the words “此路不通” and “NO EXIT” to identify false doors and similar set pieces in the set which might otherwise be mistaken for exits in the case of fire or other emergency. Such signs may be temporarily removed as necessary when the set appears on camera but must be promptly replaced thereafter.

**2.4.6** The production company, the operator-in-charge and his assistants shall ensure that all means of escape from the set are maintained in a safe condition and kept free from obstruction.

**2.4.7** No person shall interfere with any fire alarm systems or life safety systems or do anything to prevent those systems from being used unless they are likely to be mistakenly activated by the discharge of special effects materials. Prior to disarming or disengaging any such systems, the operator-in-charge shall notify the Fire Services Communication Centre (FSCC) at 2723 2233. The operator-in-charge shall restore all disarmed or disengaged systems to normal operating conditions as soon as the likelihood of false alarms from the use of special effects materials has passed and shall inform the FSCC accordingly.

## **2.5 Safety Orientation Meetings**

**2.5.1** Prior to any special effects activity, the operator-in-charge shall hold safety orientation meeting with all concerned personnel including the performers, stunt performers, support personnel and special effects operators.

**2.5.2** During the meetings, the operator-in-charge shall discuss the planned events and the intended effects, including escape routes and all ramifications concerning safety issues as they relate to the safe use of special effects materials. The meetings shall also cover the things that might go wrong and the actions to be taken by various parties with respect to fire fighting and rescue of people. All parties should also be briefed of the fire evacuation plan when the fire is out of control.

**2.5.3** When there is any change to the planned events, the intended effects or the use of special effects materials, the operator-in-charge shall hold

another safety orientation meeting. The production company shall allocate sufficient time for the operator-in-charge to conduct the meetings prior to the production of any special effects.

## **2.6 Electrical Firing Circuits**

**2.6.1** All special effects materials shall be ignited by means of electric current, unless approved otherwise by the Authority. All electrical firing units and accompanying junctions must be manufactured specifically for the intended purpose.

**2.6.2** Connecting any electric firing circuit to any power supply is prohibited until all special effects materials in the sequence are connected to firing leads and the firing area is clear of all unauthorized personnel.

**2.6.3** Power sources for firing special effects materials shall be restricted to batteries or individually isolated, ungrounded generators used for firing purposes only. Commercial or house power may be used provided the firing system is electrically isolated from the commercial or house power through the use of such items as isolation transformers. Under no condition may commercial or house power be used directly for firing purposes.

**2.6.4** All firing systems shall be designed to insure against accidental firing by providing a shunt or other control method in which no firing power can be applied to any firing circuits unless the special effects operator intentionally enables or arms the firing system before applying firing power.

**2.6.5** Computer-based electrical firing systems must incorporate some form of a dead-person switch so that all firings cease from the moment that the switch is released.

**2.6.6** All special effects materials set in or on the surface of water or other liquids shall be fired by a separate, ungrounded and uncommon two-wire circuit.

## **2.7 PSEM Firing Prerequisites**

**2.7.1** All pyrotechnic devices and fire/fireball producing devices shall be

mounted in a secure manner to maintain their proper positions and orientations, so as to ensure that the effects are produced as intended when fired. Any fire, fireball or debris thus produced shall not pose threats to human lives, or cause bodily injury or property damage. Deliberate destruction of properties or portions of the set, where destroyed as part of the special effects, shall not be considered as property damage.

**2.7.2** Pyrotechnic materials shall be fired using electrical firing units manufactured specifically for the purpose of firing fireworks or pyrotechnic materials. All electric circuits shall be tested before firing. They shall be tested with a blasting galvanometer or other similar test devices in which the test current is not capable of supplying more than 50 mA or more than one-fifth of the no fire current, whichever is the lesser.

**2.7.3** Firing systems shall not be left unattended while connected to pyrotechnic materials.

**2.7.4** Where pyrotechnic materials are placed on or in contact with a performer's body, a means of shielding or containment adequate to prevent any injury to the performer shall be provided. This protection shall be sufficient to protect against the normal functioning of the pyrotechnic materials as well as any possible malfunction.

**2.7.5** Converted electrical switch boxes, lamp sockets, lamp holders, plug fuses, or other similar thin-walled, brittle devices shall not be used for concussion mortars or flash pots.

**2.7.6** Binary systems pyrotechnic materials shall be mixed and used in accordance with the manufacturer's instructions.

**2.7.7** Binary systems pyrotechnic materials shall be mixed one unit at a time, and no more units than are needed for immediate use shall be mixed. These materials shall only be mixed in the bottles supplied by the manufacturer. No additional tools shall be used.

**2.7.8** All holders shall be constructed and secured so that they remain in a fixed position when pyrotechnic materials are discharged.

**2.7.9** Mortars and pots shall be constructed of materials having adequate strength such that the discharge of the pyrotechnic materials contained therein would not cause failure of the mortars or pots, or any distortion to their shapes. Distorted mortars and pots shall not be used.

## **2.8 Use of Special Effects Materials**

**2.8.1** Immediately before the shooting of any special effects scene, the operator-in-charge shall make a final check of wiring, positions, hookups, and special effects materials to ensure that they are in proper working order. The operator-in-charge shall also ensure that appropriate safety precautions are being provided to the performers, support personnel and other persons, and that all persons will be positioned at sufficient safety distances with adequate safety preventive measures before the discharge of the special effects materials.

**2.8.2** Special effects materials shall be fired only when the area where the special effect is to occur is in clear view of the operator-in-charge or his assistant who is in direct communication with the operator-in-charge.

**2.8.3** Immediately after each special effects scene and before support personnel remove any properties relating to the scene, the operator-in-charge shall verify that all pyrotechnic materials have been discharged. Any misfired pyrotechnic materials (including pyrotechnic materials that failed to fire) shall either be fired or disposed of in accordance with the manufacturers' instructions.

**2.8.4** After all properties and equipment relating to a special effects scene have been removed from the firing venue, the operator-in-charge shall verify that the firing venue is free of any pyrotechnic materials.

**2.8.5** All unused pyrotechnic materials shall be disposed of in accordance with the manufacturers' instructions or returned to storage as soon as possible following the production of the special effects scenes. Any unused binary system pyrotechnic materials after mixing shall be disposed of in accordance with the manufacturers' instructions.

**2.8.6** Any person holding a licence or permit issued under the Ordinance shall observe the legislative requirements in Part VIII of the Regulation relating to the reporting of notifiable occurrences to the Hong Kong Police Force and the

Authority. A notifiable occurrence is defined under section 40 of the Regulation as:

- (i) any theft or loss of pyrotechnic materials;
- (ii) any fire relating to special effects materials which requires emergency action by the Fire Services Department;
- (iii) any accident relating to the conveyance, storage or use of special effects materials which results in –
  - (a) the death of a person;
  - (b) such bodily injury to a person that the person is admitted to a hospital or clinic for treatment or observation; or
  - (c) damage to any vehicle, vessel, aircraft, train, building or any other property (the destruction of properties or portions of a production set that is intended as part of the special effects is not regarded as “damage”);
- (iv) any incident of misfire (including the failure to fire) of pyrotechnic materials which requires the assistance of the Hong Kong Police Force.

**2.8.7** The purpose of notifying the occurrence of a misfire to the Hong Kong Police Force under section 2.8.6 (iv) above is to enable a special effects operator to request assistance from the Explosive Ordnance Disposal Bureau of the Hong Kong Police Force in order to make safe a misfire which the special effects operator considers to be dangerous. This service is provided to ensure the safety of the public as well as the support personnel.

**2.8.8** The operator-in-charge shall inform the Vessel Traffic Centre (VTC) of the Marine Department at 2233 7801 before and after discharging of special effects materials on a vessel when such discharge may impair the look-out of the other vessels in the vicinity in making an appraisal of the situation or of the risk of collision.

**2.8.9** When discharging special effects materials at sea or on shore, the special effects produced shall not be mistaken to any lights, shapes or signals described as Distress Signal in Annex IV of the International Regulations for Preventing Collisions at Sea 1972 in the Schedule to the Merchant Shipping (Safety) (Signals of Distress and Prevention of Collisions) Regulations (Cap. 369 sub. leg.).

**2.8.10** When the discharge of special effects materials may affect aircrafts in the air, the operator-in-charge shall inform the Aerodrome Supervisor of the Aerodrome Control Tower at 2910 6822 before and immediately after firing.

### **3. Using Special Effects Materials under a Stream B Discharge Permit**

#### **3.1 Introduction**

**3.1.1** This section deals with the use of special effects materials under a Stream B discharge permit. A Stream B discharge permit is issued for the production of special effects in literary, dramatic, musical and artistic works and other similar stage productions normally performed before a proximate audience.

**3.1.2** The operator-in-charge referred to in this section means the special effect operator named in a discharge permit issued under section 11 of the Ordinance.

**3.1.3** Section 11 of the Regulation stipulates that a discharge permit is not required for the discharge of non-pyrotechnic special effects materials under certain conditions. Nevertheless, the guidance given in this section is still relevant to such discharge, and any reference to the operator-in-charge should then refer to the special effects operator(s) responsible for the special effects.

#### **3.2 General Obligation**

**3.2.1** Safety of the public, audience, performers, special effects operators and support personnel is the prime consideration in all events involving the use of special effects materials. In order to ensure the safety of all concerned, the operator-in-charge named in a discharge permit has the final decision in all matters pertaining to the discharge of the special effects materials.

**3.2.2** If unforeseen hazards develop with regard to the people concerned, properties, weather conditions, the firing venue, or the special effects materials, the operator-in-charge and his assistants have the responsibility to stop the production of a particular special effect or all special effects until safety is restored, regardless of the pressure from the production personnel, performers, audience or other sources.

**3.2.3** Although the operator-in-charge is responsible for the use of special effects materials, including the final decision to discharge, under section 29(4) of the Ordinance, the Authority and any officer referred to in section 29(1) of the Ordinance may prevent or stop the use of special effects materials when the circumstances under which such use is determined by him to be likely to endanger

life or cause serious injury to property.

**3.2.4** Notwithstanding any discharge permit issued by the Authority, before the production of special effects on any premises, the production company shall obtain permission from the owner/agent/management of the premises. In case of firing on a vessel, the permission of the master or person in charge of the vessel shall be obtained. The operator-in-charge responsible for the use of the special effects materials shall verify with the production company that such permission has been duly obtained prior to using the materials.

**3.2.5** The production company shall give sufficient advance notice and details of the intended special effects to the operator-in-charge to allow him to safely plan the special effects. If significant changes are made to these plans, then additional time must be provided to safely accommodate the changes.

**3.2.6** The production company shall allocate sufficient time for the operator-in-charge and his assistants to safely perform their work including the conveying, storing, assembling, firing and disposing of all special effects materials. While handling such materials, they shall not be interrupted or distracted by the production company from focusing on their work, and shall never be pressured to hurry.

**3.2.7** The production company shall obtain permissions from the management/agent/owner of the premises and/or relevant government departments for the temporary closure of affected areas.

**3.2.8** The production company shall authorised and cooperate with the operator-in-charge to prevent unauthorised persons gaining access to the discharge areas, until completion of firing and the operator-in-charge has determined the area to be safe and secure.

**3.2.9** The production company and the operator-in-charge shall maintain sufficient separation distances from the special effects, so as to ensure that safety of all people including the audience, the performers, the guests and all support personnel. If necessary, effective personal protective equipment shall be provided to the performers.

**3.2.10** The production company and the operator-in-charge shall provide

effective measures to reduce or remove nuisance caused by the discharge of special effects materials.

**3.2.11** The production company and the operator-in-charge shall observe the Employment Ordinance (Cap. 57) with respect to the employment of children aged below 15.

**3.2.12** The production company and the operator-in-charge shall provide first aid facility at the firing venue not less than those specified in the Occupational Safety and Health Ordinance (Cap. 509).

**3.2.13** The production company and all special effects operators shall ensure that there is no breach of the Dangerous Goods Ordinance (Cap. 295) and its subsidiary legislation with respect to the use, storage and conveyance of non-pyrotechnic materials.

**3.2.14** The production company and all special effects operators shall ensure that there is no breach of the Gas Safety Ordinance (Cap. 51) and its subsidiary legislation with respect to the storage and conveyance of liquefied petroleum gas (LPG), and shall observe additional requirements for the safe use of LPG which are given in the Code of Practice on the Use of LPG for the Production of Special Effects (CP2).

### **3.3 General Safety Requirements**

**3.3.1** For special effects events of small scale or low risk, the operator-in-charge shall undertake or engage an experienced person to undertake a risk assessment for all the activities under his control. The control measures identified in the risk assessment should be communicated to the production company and all those concerned for implementation prior to any special effects activities. In general, control measures may include –

- (i) personal protective equipment (PPE);
- (ii) determination of safe distances;
- (iii) controls against noise, blast and radiated heat;
- (iv) control of debris, toxic effects and spread of fire;
- (v) emergency arrangement for dealing with events that do not go according to plan;

(vi) misfires.

**3.3.2** For special effects events of large scale or high risk, the operator-in-charge shall undertake thorough planning and designing the event with the objective of managing all the associated risks. The operator-in-charge shall develop a work procedure to carry out all activities in a safe manner, using a risk assessment process (see para. 3.3.3 below). All the planning and designing work shall be documented to form the contents of the “Work Procedure and Method Statement”. An emergency plan shall also be prepared. The operator-in-charge shall also keep records of the weather conditions, details of misfires, names of all special effects operators involved, and any irregularities or unusual incidents.

**3.3.3** For special effects events of large scale or high risk, the operator-in-charge shall undertake or engage an experienced person to undertake a full risk assessment. The risk assessment shall be site-specific and cover all activities associated with the various stages in the life cycle of the special effects materials including conveyance, storage, setting-up, discharge, handling of misfires and surplus materials. The risk assessment should include three key processes:

- (i) hazard identification;
- (ii) risk evaluation;
- (iii) risk control.

The risk assessment should tie in with the “Work Procedure and Method Statement” mentioned in para. 3.3.2 above. If necessary, revision of the Work Procedure and Method Statement should be made so as to mitigate the risks. All identified control measures should be communicated to the production company and all those concerned for implementation prior to any special effects activities.

**3.3.4** No special effects operators shall use special effects materials while under the influence of intoxicating beverages, alcohol, narcotics, prescription or non-prescription drugs or other substances that can impair judgement or movement. The operator-in-charge has the responsibility of ensuring his assistants to comply with this requirement.

**3.3.5** The production company and the operator-in-charge shall ensure that the set is sufficiently well lighted by natural or artificial lighting during the handling and installation of special effects materials.

**3.3.6** The production company shall install at the set effective means for draining the set if any activity may make the floor of the set wet or slippery.

**3.3.7** No pyrotechnic materials shall be left unattended.

**3.3.8** Mobile telephones, radio transmitters and other devices that may cause accidental initiation of any pyrotechnic materials shall be kept away from the pyrotechnic materials as far as practicable. The risk of accidental initiation of pyrotechnic materials will much depend upon the strength and frequency of radio frequency field of the transmitter and the antenna configuration formed by the leg wires or circuit wires connected to the pyrotechnic materials. The operator-in-charge shall search for and identify any devices or sources of radio waves in a firing venue, and confirm that these will not affect the pyrotechnic materials to be used in the area. As a general rule, mobile telephones shall be switched off at least within 3.5 m of the pyrotechnic materials.

#### **3.4 Fire Protection and Precautions**

**3.4.1** While special effects materials are being used, the operator-in-charge shall ensure that -

- (i) adequate fire extinguishers appropriate to the types of special effects materials used are readily available and located in the vicinity of the discharge area; and
- (ii) personnel who have a working knowledge of the use of the above fire extinguishing equipment are present at all times while the special effects materials are being used or removed.

**3.4.2** The operator-in-charge and his assistants shall ensure that smoking is not permitted within at least 7.6 m of the area where special effects materials are used. The operator-in-charge may, if he considers it safe, allow smoking by performers as part of the act. The operator-in-charge shall ensure signs bearing the words “不准吸煙” and “No Smoking” are posted in suitable locations.

**3.4.3** The production company and the operator-in-charge shall maintain the set where special effects materials are used in a neat and orderly condition, and

free of any fire nuisance that can create a fire hazard.

**3.4.4** The production company, the operator-in-charge and his assistants shall ensure that all means of escape from the set are maintained in a safe condition and kept free from obstruction.

**3.4.5** No person shall interfere with any fire alarm systems or life safety systems or do anything to prevent those systems from being used unless they are likely to be mistakenly activated by the discharge of special effects materials. Prior to disarming or disengaging any such systems, the operator-in-charge shall notify the Fire Services Communication Centre (FSCC) at 2723 2233. The operator-in-charge shall restore all disarmed or disengaged systems to normal operating conditions as soon as the likelihood of false alarms from the use of special effects materials has passed and shall inform the FSCC accordingly.

### **3.5 Safety Briefings and Rehearsals**

**3.5.1** The operator-in-charge shall warn all performers and support personnel that they are exposed to a hazardous situation when performing or otherwise carrying out their responsibilities in the vicinity of the special effects materials.

**3.5.2** Prior to the actual performance, the operator-in-charge shall brief all participants performing in a special effects scene of the planned events, the intended effects, the things that might go wrong and the actions to be taken by various parties when these occur. For complicated scenes, a rehearsal should be conducted to demonstrate the intended special effects, the position and the interaction of the performers, and the duties of the support personnel.

**3.5.3** When there is any change to the originally planned event that may pose higher hazard levels to the audience, the performers or other people concerned (such as changes to the use of special effects materials, the position or the interaction of the performers), the operator-in-charge shall conduct another rehearsal prior to the actual performance.

**3.5.4** The rehearsals shall be complete long before the commencement of the actual show to provide a sufficient time lapse for the special effects operators to reset or reload the special effects materials.

## **3.6 Electrical Firing Circuits**

**3.6.1** All special effects materials shall be ignited by means of electric current, unless approved otherwise by the Authority. All electrical firing units and accompanying junctions must be manufactured specifically for the intended purpose.

**3.6.2** Connecting any electric firing circuit to any power supply is prohibited until all special effects materials in the sequence are connected to firing leads and the firing area is clear of all unauthorized personnel.

**3.6.3** Power sources for firing special effects materials shall be restricted to batteries or individually isolated, ungrounded generators used for firing purposes only. Commercial or house power may be used provided the firing system is electrically isolated from the commercial or house power through the use of such items as isolation transformers. Under no condition may commercial or house power be used directly for firing purposes.

**3.6.4** All firing systems shall be designed to insure against accidental firing by providing a shunt or other control method in which no firing power can be applied to any firing circuits unless the special effects operator intentionally enables or arms the firing system before applying firing power.

**3.6.5** Computer-based electrical firing systems must incorporate some form of a dead-person switch so that all firings cease from the moment that the switch is released.

**3.6.6** All special effects materials set in or on the surface of water or other liquids shall be fired by a separate, ungrounded and uncommon two-wire circuit.

## **3.7 PSEM Firing Prerequisites**

**3.7.1** All pyrotechnic devices and fire/fireball producing devices shall be mounted in a secure manner to maintain their proper positions and orientations, so as to ensure that the effects are produced as intended when fired. Any fire, fireball or debris thus produced shall not pose threats to human lives, or cause bodily injury

or property damage.

**3.7.2** Pyrotechnic materials shall be fired using electrical firing units manufactured specifically for the purpose of firing fireworks or pyrotechnic materials. All electric circuits shall be tested before firing. They shall be tested with a blasting galvanometer or other similar test devices in which the test current is not capable of supplying more than 50 mA or more than one-fifth of the no fire current, whichever is the lesser.

**3.7.3** Firing systems shall not be left unattended while connected to pyrotechnic materials.

**3.7.4** Where pyrotechnic materials are placed on or in contact with a performer's body, a means of shielding or containment adequate to prevent any injury to the performer shall be provided. This protection shall be sufficient to protect against the normal functioning of the pyrotechnic materials as well as any possible malfunction.

**3.7.5** Converted electrical switch boxes, lamp sockets, lamp holders, plug fuses, or other similar thin-walled, brittle devices shall not be used for concussion mortars or flash pots.

**3.7.6** Binary systems pyrotechnic materials shall be mixed and used in accordance with the manufacturer's instructions.

**3.7.7** Binary systems pyrotechnic materials shall be mixed one unit at a time, and no more units than are needed for immediate use shall be mixed. These materials shall only be mixed in the bottles supplied by the manufacturer. No additional tools shall be used.

**3.7.8** All holders shall be constructed and secured so that they remain in a fixed position when pyrotechnic materials are discharged.

**3.7.9** Mortars and pots shall be constructed of materials having adequate strength such that the discharge of the pyrotechnic materials contained therein would not cause failure of the mortars or pots, or any distortion to their shapes. Distorted mortars and pots shall not be used.

**3.7.10** Rotating pyrotechnic devices, such as wheels and saxons, shall be

mounted securely so that their rotation does not cause the holder to fail.

**3.7.11** Flares shall be placed so that any hazardous debris falls into a safe, flame-resistant area.

**3.7.12** Comets, mines and rockets shall be fired so that the trajectory of any projected pyrotechnic materials or debris is not carried over or does not fall into the audience.

**3.7.13** Waterfalls shall be placed for firing so that no flammable materials are within the fallout area.

**3.7.14** Concussion mortars shall be placed in a secure location that prevents the audience and support personnel from gaining access to the location. The concussion mortars can be secured by placing them under the stage or by placing them behind barricades.

### **3.8 Use of Special Effects Materials**

**3.8.1** Immediately before the performance, the operator-in-charge shall make a final check of wiring, positions, hookups, and special effects materials to ensure that they are in proper working order. The operator-in-charge also shall ensure that appropriate safety precautions are being provided to the performers, support personnel and other persons, and that all persons will be positioned at sufficient safety distances with adequate safety preventive measures before the discharge of the special effects materials.

**3.8.2** Unless specified otherwise in a discharge permit, the production company shall, at the commencement of a performance, announce to the audience attending the performance in live of the use of pyrotechnic materials during the performance including a warning of loud report if concussion effects will be included.

**3.8.3** Special effects materials shall be fired only when the area where the special effect is to occur is in clear view of the operator-in-charge or his assistant who is in direct communication with the operator-in-charge.

**3.8.4** Immediately after each performance and before support personnel remove any properties relating to a special effects scene, the operator-in-charge shall verify that all pyrotechnic materials have been discharged. Any misfired pyrotechnic materials (including pyrotechnic materials that failed to fire) shall either be fired or disposed of in accordance with the manufacturers' instructions.

**3.8.5** After all properties and equipment relating to a special effects scene have been removed from the firing venue, the operator-in-charge shall verify that the firing venue is free of any pyrotechnic materials.

**3.8.6** All unused pyrotechnic materials shall be disposed of in accordance with the manufacturers' instructions or returned to storage as soon as possible following the production of the special effects scenes. Any unused binary system pyrotechnic materials after mixing shall be disposed of in accordance with the manufacturers' instructions.

**3.8.7** Where pyrotechnics materials are discharged, the smoke and fumes developed shall not deteriorate the air quality to an unacceptable level and shall not obscure the visibility of exit signs or paths of egress travel. Smoke and fumes shall be directed away from any air intakes.

**3.8.8** The production company shall ensure that the firing venue is sufficiently ventilated if special effects materials are discharged indoor.

**3.8.9** Any person holding a licence or permit issued under the Ordinance shall observe the legislative requirements in Part VIII of the Regulation relating to the reporting of notifiable occurrences to the Hong Kong Police Force and the Authority. A notifiable occurrence is defined under section 40 of the Regulation as:

- (i) any theft or loss of pyrotechnic materials;
- (ii) any fire relating to special effects materials which requires emergency action by the Fire Services Department;
- (iii) any accident relating to the conveyance, storage or use of special effects materials which results in –
  - (a) the death of a person;
  - (b) such bodily injury to a person that the person is admitted to a hospital or clinic for treatment or observation; or

- (c) damage to any vehicle, vessel, aircraft, train, building or any other property (the destruction of properties or portions of a production set that is intended as part of the special effects is not regarded as “damage”);
- (iv) any incident of misfire (including the failure to fire) of pyrotechnic materials which requires the assistance of the Hong Kong Police Force.

**3.8.10** The purpose of notifying the occurrence of a misfire to the Hong Kong Police Force under section 3.8.9 (iv) above is to enable a special effects operator to request assistance from the Explosive Ordnance Disposal Bureau of the Hong Kong Police Force in order to make safe a misfire which the special effects operator considers to be dangerous. This service is provided to ensure the safety of the public as well as the support personnel.

**3.8.11** The operator-in-charge shall inform the Vessel Traffic Centre (VTC) of the Marine Department at 2233 7801 before and after discharging of special effects materials on a vessel when such discharge may impair the look-out of the other vessels in the vicinity in making an appraisal of the situation or of the risk of collision.

**3.8.12** When discharging special effects materials at sea or on shore, the special effects produced shall not be mistaken to any lights, shapes or signals described as Distress Signal in Annex IV of the International Regulations for Preventing Collisions at Sea 1972 in the Schedule to the Merchant Shipping (Safety) (Signals of Distress and Prevention of Collisions) Regulations (Cap. 369 sub. leg.).

**3.8.13** When the discharge of special effects materials may affect aircrafts in the air, the operator-in-charge shall inform the Aerodrome Supervisor of the Aerodrome Control Tower at 2910 6822 before and immediately after firing.

## **4. Storage of Pyrotechnic Materials**

### **4.1 Introduction**

This section provides guidance for the safe storage of pyrotechnic materials. The “store” referred to in this section means a location or a container for the storage of pyrotechnic materials where a store licence has been issued under section 24 of the Ordinance. The operator-in-charge referred to in this section means the special effects operator named in the store licence or any replacement operator-in-charge appointed under section 35 of the Regulation.

### **4.2 General Safety Requirements**

**4.2.1** All pyrotechnic materials shall be stored at all times in a store licensed or approved by the Authority unless they are being conveyed or used.

**4.2.2** All pyrotechnic materials shall be stored in accordance with compatibility requirements specified in the store licence issued by the Authority.

**4.2.3** A non-movable store shall be provided with sufficient ventilation and the pyrotechnic materials stored therein shall be arranged so that uniform circulation of air is ensured.

**4.2.4** Where lighting is necessary within a store, electric safety lights or electric safety lanterns to the satisfaction of the Authority shall be used.

**4.2.5** There shall be no exposed ferrous metal on the interior of a store. The floor of a store shall be constructed of wood or other equivalent material. Floors constructed of materials that can cause sparks shall be covered with a nonsparking surface.

**4.2.6** Floors of a store shall be swept regularly and kept clean, dry, and free of grit, dust, empty packing materials and rubbish. Brooms and other cleaning utensils shall not have spark-producing metal parts.

**4.2.7** Spills of pyrotechnic composition shall be cleaned up and removed immediately from a store. The spilled material shall be destroyed in a safe and appropriate manner.

**4.2.8** Mixing, assembling, wiring or working with any pyrotechnic materials or pyrotechnic composition is prohibited in any store where pyrotechnic materials are stored.

**4.2.9** No special effects operators, employees or other persons shall be permitted to enter a store while in possession of or under the influence of intoxicating beverages, alcohol, narcotics, prescription or non-prescription drugs or other substances that can impair judgement or movement. The person holding a store licence shall ensure that all persons comply with this requirement.

**4.2.10** Boxes of pyrotechnic materials shall be piled in a store in a stable manner and laid flat with top side up. Boxes shall never be piled too high that it may cause difficulty to handle the top box.

**4.2.11** Boxes of pyrotechnic materials shall not be opened, unpacked, or repacked inside of a store or in close proximity to other pyrotechnic materials. The boxes must be properly closed before returning them to the store. However, it is permissible to open a box within a store for inspection of its contents or for the removal of a small quantity of pyrotechnic materials contained therein.

**4.2.12** Since pyrotechnic materials deteriorate with age, attention should always be paid to the turnover of stock. The older stock should be used first on a first-in-first-out (FIFO) basis. Care must be taken not to leave old stock at the back of a store when a new supply is brought in.

**4.2.13** Mobile telephones, radio transmitters and other devices that may cause accidental initiation of pyrotechnic materials shall not be permitted inside of a store.

### **4.3 Fire Protection and Precautions**

**4.3.1** Repair work shall not be carried out inside a store unless all pyrotechnic materials have been removed and all floors swept and clean.

**4.3.2** If there is a possibility of causing sparks or fire in the course of repairing the exterior of a store, all pyrotechnic materials shall be removed before commencement of the repair work.

**4.3.3** Smoking, matches, open flames, spark-producing devices, and firearms shall not be permitted inside of or within 15 m of a store.

**4.3.4** Signs bearing the words “不准吸煙” and “No Smoking” must be fixed on the external face of the door to a non-movable store and also at suitable locations outside and inside of the store.

**4.3.5** Appropriate portable fire extinguishers and other fire fighting equipment shall be provided in readily accessible locations in or near a store or the designated area. Employees working at the store should familiarise themselves with the use of fire fighting equipment.

**4.3.6** The operator-in-charge of a store shall prepare an emergency action plan that provides specific directions to be followed in the event of a fire or explosion of the store or the designated area. The operator-in-charge shall also brief employees working at the store thoroughly on the emergency action plan.

**4.3.7** The emergency plan shall include instructions on the use of portable fire extinguishers and the identification of those fires on which the extinguishers can be used effectively. The emergency plan shall also include an evacuation plan and the direction for all personnel to abandon fire-fighting efforts if the fire appears to be spreading to the pyrotechnic materials.

**4.3.8** Binary system pyrotechnic materials shall be stored in a manner that the two components are kept separate from each other in different containers.

#### **4.4 Storage of Pyrotechnic Materials on the Set**

**4.4.1** A movable store containing pyrotechnic materials shall never be left unattended at any one time.

**4.4.2** A movable store when used as a storage of pyrotechnic materials on the set or firing venue shall not be exposed to direct sunlight and shall be placed at a secure and safe location and free of any conditions that can create a fire hazard.

## **5. Conveyance of Pyrotechnic Materials**

### **5.1 Introduction**

**5.1.1** Section 21 of the Ordinance provides that no person shall convey any pyrotechnic materials by land or water without a conveyance permit unless otherwise exempted by regulations. Section 23 of the Regulation specifies the circumstances where a conveyance permit is not required.

**5.1.2** Whether or not a conveyance permit is required, any persons engaged in or responsible for the loading, unloading or carriage of pyrotechnic materials shall observe the guidance provided in this section for the safe conveyance of pyrotechnic materials.

### **5.2 General Safety Requirements**

**5.2.1** Pyrotechnic materials shall be conveyed in accordance with the compatibility requirements specified below:

- (i) the United Nations Recommendations on the Transport of Dangerous Goods;
- (ii) the International Maritime Dangerous Goods Code; or
- (iii) the conditions stipulated in a conveyance permit or otherwise approved by the Authority.

**5.2.2** Unless specified otherwise in a conveyance permit, special effects operator carrying pyrotechnic materials in a vehicle or vessel shall provide at least one efficient fire extinguisher, readily available for immediate use in the vehicle or vessel.

**5.2.3** Any vehicle or vessel carrying pyrotechnic materials shall never be left unattended at any one time.

**5.2.4** No person shall be permitted to load, unload or carry any pyrotechnic materials while in possession of or under the influence of intoxicating beverages, alcohol, narcotics, or prescription or non-prescription drugs or other substances that can impair judgement or movement. The person holding a conveyance permit and/or the special effects operator supervising the conveyance shall ensure that all persons comply with this requirement.

**5.2.5** While loading, unloading or carriage of pyrotechnic materials is in progress, all persons engaged in the loading, unloading or carriage shall –

- (i) not smoke or allow any person to smoke within 15 m of the vehicle or vessel; and
- (ii) take all necessary precautions for the prevention of fire, explosions or other accidents, and for preventing unauthorised persons from having access to the pyrotechnic materials being loaded or loaded.

**5.2.6** Any persons engaged in the loading, unloading and carriage of pyrotechnic materials shall have received a briefing necessary to perform the work safely. Such briefing, which may be formal, informal or simply on the job, should be provided by a licensed special effects operator, a licensed supplier or other competent persons.

**5.2.7** Any container containing pyrotechnic materials shall be handled with care to prevent undue impact or exposure to excessive heat, flame or direct sunlight.

**5.2.8** Designated items shall be conveyed in a separate compartment from other pyrotechnic materials. Detonators shall be conveyed in a separate compartment from other designated items and other pyrotechnic materials.

**5.2.9** Binary system pyrotechnic materials shall be conveyed in such a manner that the two components are kept separate from each other in different containers.

### **5.3 Conveyance of Pyrotechnic Materials in a Vehicle**

**5.3.1** No person shall convey any pyrotechnic materials in any vehicle, unless the vehicle is in good working order and roadworthy.

**5.3.2** A vehicle carrying pyrotechnic materials shall be operated at a speed and in a manner conforming to the Road Traffic Ordinance (Cap. 374) and other relevant subsidiary legislation, and that the speed is consistent with road and weather conditions.

**5.3.3** Where a conveyance permit is required for the conveyance of any pyrotechnic materials, a vehicle carrying the pyrotechnic materials shall bear signs including placards, signals and flags in the form and manner specified in the conveyance permit.

**5.3.4** In the case where a conveyance permit is not required, the special effects operators responsible for the conveyance shall, as far as practicable, attach placards at the rear or sides of the vehicle containing pyrotechnic materials. The placards should bear the highest hazard level imposed by the pyrotechnic materials being conveyed. These placards shall be removed when the vehicle does not carry any pyrotechnic materials.

**5.3.5** Before a vehicle is being loaded with pyrotechnic materials, the special effects operator supervising the conveyance shall confirm with the driver of the vehicle that it has sufficient petrol to cover the whole journey and any unexpected events. In the event that refuelling is needed due to exceptional and unforeseen circumstances, the engine of the vehicle shall be stopped, the ignition shut off and the tank filled only at a place where filling will not pose a hazard to public safety. In any case, refuelling at a fuel station or through a fuel truck is prohibited.

**5.3.6** The driver and the special effects operators on board of a vehicle carrying pyrotechnic materials shall notify as soon as practicable the Hong Kong Police Force of the details of the materials on board should the vehicle be involved in any traffic accident.

## **5.4 Conveyance of Pyrotechnic Materials in a Vessel**

**5.4.1** Conveyance of pyrotechnic materials in a vessel shall comply with the provisions of the Dangerous Goods (Shipping) Regulations (Cap. 295 sub. leg.).

**5.4.2** A vessel intended for conveyance of pyrotechnic materials not exceeding those specified in section 25(2) of the Regulation shall be of a type approved by the Director of Marine, the list of which is available in the office of the Authority. The master, the person in charge of the vessel and the special effects operators supervising the conveyance of pyrotechnic materials shall comply with the following requirements:

- (i) the vessel is in good working order, seaworthy and possess a valid licence issued by the Director of Marine;
- (ii) no passengers other than those holding a valid special effects operator licence shall be conveyed in the vessel at the same time as the vessel is conveying pyrotechnic materials;
- (iii) the special effects operators shall not permit the loading or unloading of pyrotechnic materials in inclement weather;
- (iv) the special effects operators shall give sufficient advance notice with details of the pyrotechnic materials to be conveyed to the master or the person in charge of the vessel to allow the installation of the necessary signals or lights in the vessel for the conveyance;
- (v) the special effects operators shall brief the master or the person in charge of the vessel on safety issues before and during the conveyance including the danger of using radio transmitters near the pyrotechnic materials and smoking in the vessel, etc; and
- (vi) any other conditions and manner stipulated by the Director of Marine and the Authority in accordance with section 25(3) of the Regulation.

**5.4.3** Conveyance of pyrotechnic materials of quantities not exceeding those specified in section 25(2) of the Regulation with other special effects materials in a vessel may be allowed provided that such conveyance is in accordance with the conditions and manner stipulated by the Director of Marine and the Authority.

**5.4.4** A vessel carrying pyrotechnic materials shall display signals in accordance with section 37 of the Merchant Shipping (Local Vessels)(General) Regulations (Cap. 548F).

**5.4.5** The master or the person in charge of a vessel and the special effects operators on board of the vessel carrying pyrotechnic materials shall forthwith notify the Vessel Traffic Centre (VTC) of the Marine Department at 2233 7801 or 2233 7808 of the materials on board should the vessel be involved in a collision or other accident.

## 6. Glossary

The definitions given below provide a glossary of common terms and jargons used by the trade. Some terms defined in the Entertainment Special Effects Ordinance (the Ordinance) and the Entertainment Special Effects (General) Regulation (the Regulation) are also included for ease of reference.

**Action (開始)** means the order given by the director to begin the action within a shot, once the film in the camera and/or the sound recording equipment are running at filming speed.

**Aerial shell (禮花彈)** means a cylindrical or spherical cartridge containing pyrotechnic materials, a long fuse or electric match wires, and a black powder lift charge. The black powder is used as a lifting charge to project the shell from a mortar.

**Air bag (氣墊)** means a large air supported membrane designed to withstand the fall from a stunt performer.

**Air ram (彈板)** means a catapult designed for propelling a stunt performer. This stunt is extremely dangerous if the stunt performer was not properly trained.

**Airburst (空中火花)** means a pyrotechnic material containing flash powder that is suspended in the air to simulate outdoor aerial fireworks shells without producing hazardous debris.

**Anthracene (蒽)** means a corrosive material which may easily be ignited by flame or heat. It is not classified as a pyrotechnic material.

**Appeal Board (上訴委員會)** means an appeal board appointed under section 37 of the Ordinance.

**Arcing match (火花線)** means a black match that has been made with nodules of sparking compound spaced along the length of the string.

**Authority (監督)** means the Entertainment Special Effects Licensing Authority established by section 3 of the Ordinance.

**Binary system flash powder** (二元閃光粉) means a binary system pyrotechnic material which becomes flash powder when the two ingredients are mixed together. It is also known as two component flash powder.

**Binary system pyrotechnic material** (二元煙火物料) means a two-component pyrotechnic material which is shipped as two separate ingredients: an oxidizer and a fuel. The ingredients do not possess the properties of a pyrotechnic material until they are mixed.

**Black match** (黑藥引|火線) means a fuse made from cotton string impregnated with black powder. Black match is frequently used in conjunction with a squib or electric match to ignite other pyrotechnic materials.

**Black powder** (黑火藥) means a pyrotechnic material consisting of an intimate mixture of potassium nitrate, sulphur and charcoal. Black powder is also known as gun powder.

**Black powder bomb** (黑火藥彈), see lifter.

**Blank cartridge** (空包彈) means a cartridge designed to simulate firearms discharge constructed from either metal or plastic casing, with a center or rim fire primer filled with various amounts of pyrotechnic materials. Modified firearms are often used for the firing of blank cartridges. Blank cartridges and firearms are controlled under the Firearms and Ammunition Ordinance (Cap. 238).

**Blasting galvanometer** (爆破電流計) means an electrical resistance measuring device designed specifically and approved for testing of electric firing circuits.

**Body burn** (身體燃燒) means a fire stunt which involves the total or partial burning of an experienced stunt performer who has taken all necessary safety precautions to protect himself from injury.

**Bridgewire** (鎢絲) means a fine wire that either heats up or ignites when an electric current is applied. It is used to fire pyrotechnic materials.

**Bullet hit (反應彈)** means a small pyrotechnic device attached to a performer's clothing or to an object such as a set piece or prop to create the illusion of a bullet impact. Bullet hits may be used to simulate the effects of body hits, wall hits, ground hits or bullets striking on a hard object.

**Bullet hit effect (反應彈效果)** means a pyrotechnic effect produced by the discharge of bullet hits. Modified firearms firing blank cartridges are often used in conjunction with bullet hit effects.

**Camera car (攝影車)** means a specially designed vehicle where cameras are mounted for filming driving shots.

**Can popper (樽裝氣爆斗)** means an LPG equipment used to produce fireball effects through the ignition of a sudden release of LPG stored in a disposable metal container. This device utilizes a small lifter or other pyrotechnic materials as a power source to puncture the metal container.

**Cannon (翻車爆斗)** means a device consisted of a mortar fitted with a piston made of steel or wooden post. The mortar is made of steel and is welded to the frame of a vehicle. Upon ignition of a lifter inside the mortar, the explosion ejects the piston causing the vehicle to roll over or flip into the air.

**Cannon roll (翻車)** means a stunt involving flipping and/or spinning of a vehicle caused by the discharge of a cannon.

**Capsule (彈囊)** means a projectile intended for use in a pneumatic capsule launcher for purposes of creating visual or audible special effects.

**Colour pot (顏色火柱筒)** means a tube containing pyrotechnic materials. It produces a coloured flame when ignited.

**Coloured smoke (顏色煙)** means an aerosol of special dyestuffs of chemical reactants dispersed through the discharge of pyrotechnic materials.

**Comet (彗星煙花)** means a pellet of pyrotechnic composition intended to be used in a mortar tube installed with black powder as a lifting charge. Comets frequently leave a trail of sparks as they rise in the air, and they sometimes burst into smaller fragments at their zenith.

**Compatibility (相容性)** means the state of a pyrotechnic material being compatible with another pyrotechnic material.

**Compatible (相容)** means pyrotechnic materials that can be transported together without significantly increasing the probability of an accident or the magnitude of the effects of such an accident.

**Competent authority (有關當局)**, as defined under section 2 of the Regulation, means any authority outside Hong Kong responsible for –

- (a) in the case of qualifications for a special effects operator to be licensed, the issue of special effects operator licences or their equivalents; and
- (b) in the case of registration of pyrotechnic special effects materials, the classification and authorisation of the conveyance, storage or use of pyrotechnic special effects materials,

in the country, state, province or territory under its jurisdiction.

**Concussion effect (響炮效果)** means a pyrotechnic effect that produces a loud noise and a violent jarring shock for dramatic effect.

**Concussion flash powder (響炮閃光粉)** means a kind of flash powder intended to be used in a concussion mortar to produce a concussion effect.

**Concussion mortar (響炮爆斗)** means a mortar specifically designed and constructed to produce a concussion effect.

**Convey (運送)**, as defined under section 2 of the Ordinance, includes stow.

**Conveyance permit (運送許可證)** means a permit issued under section 22 of the Ordinance.

**Day box (煙火物料儲存箱)** means a portable container for immediate storage of pyrotechnic materials for use at the firing venue.

**Deflagration (爆燃)** means a rapid chemical reaction involving pyrotechnic materials in which the output of heat is sufficient to sustain the reaction. Deflagration is primarily a surface phenomenon, with reaction progresses at less than supersonic velocity and most of the reaction products flowing away from the unreacted materials along the surface. The effect of a deflagration under confinement is an explosion. Confinement of the reaction increases pressure, rate of reaction, and temperature and, in some cases, can cause transition into a detonation.

**Designated item (指定物料)**, as defined under section 2 of the Regulation, means any pyrotechnic special effects material classified as such in the register denoting that the material poses a high risk to safety.

**Detonating cord (導爆索)** means a flexible cord with pyrotechnic materials inside and encased in a coating of fabric or other material used or manufactured with a view to producing or transmitting detonation. It may also be used as a cutting device.

**Detonation (震爆或爆轟)** means an extremely rapid chemical reaction involving pyrotechnic materials in which the pressure generated is sufficient to cause the formation of a shock wave, which causes the reaction to continue. Detonation is a phenomenon with reaction progresses at supersonic velocity towards the unreacted materials. The effect of a detonation with or without confinement is an explosion.

**Detonator (雷管)**, as defined under section 2 of the Regulation, includes any materials used or manufactured with a view to producing detonation or initiating another pyrotechnic special effects material by means of detonation.

**Discharge or discharging (燃放)**, as defined under section 2 of the Ordinance, means the ignition, initiation or firing of a material by flame, heat, light, friction, impact, electric current or any other means with a view to producing a visual or audible effect or a combination of both by a chemical reaction.

**Discharge permit (燃放許可證)** means a permit issued under section 11 of the Ordinance.

**Dud (啞彈)** means an aerial shell that rises from a mortar but fails to function.

**Electric firing (電子點火)** means a technique used to discharge special effects materials in which a bridgewire, electric match, igniter or squib and a source of electric current are used to cause ignition of the special effects materials.

**Electric match (電火柴)** means a pyrotechnic device consisting of a bridgewire coated with a small quantity of heat-sensitive pyrotechnic materials. It ignites when an electric current flows through the bridgewire. An electric match is used to ignite other pyrotechnic materials. Electric matches are often incorrectly called squibs.

**Entertainment programme (娛樂節目)**, as defined under section 2 of the Ordinance, includes –

- (a) any film, commercial and television broadcast programme; and
- (b) any literary, dramatic, musical and artistic works performed before a live audience or otherwise, and similar production,

but does not include fireworks displays.

**Entertainment special effects (娛樂特別效果)**, as defined under section 2 of the Ordinance, means any visual or audible effect or a combination of both created by means of any special effects materials for the production of an entertainment programme.

**Explosion (爆炸)** means the rapid production of hot gases at a high pressure as the result of a chemical reaction and the sudden release of the energy to cause strong dynamic stresses in the surroundings. The term usually refers to the effects of a detonation but also applies to the effect of a deflagration in certain circumstances such as under heavy confinement. The term also describes a mechanical phenomenon in which there is a sudden release of pressure caused by the bursting of a container.

**Fallout area (碎片墜落範圍)** means the area in which any hazardous debris falls after the discharge of special effects materials. The fallout area is defined as a circle that, in turn, is defined by the fallout radius.

**Fallout radius** (碎片墜落半徑) means a line that defines the fallout area. The line is defined by two points. The first point is at the centre of the special effects materials being discharged. The second point is the point most distant from the materials at which any hazardous debris can fall.

**Fire bar** (火條) means an LPG equipment used to produce flame effects through the controlled release of LPG. It is made of steel or copper pipe perforated with small holes or slots and comes in all shapes and lengths to produce many different effects. It may operate without the use of any pyrotechnic material.

**Fire nuisance** (有礙消防安全的事物) means anything or any act which may increase or cause an increase in the hazard or menace of a fire, or which may obstruct, delay, or hinder, or may become the cause of any obstruction, delay, or hindrance, to the prevention or extinguishment of a fire.

**Flash bag** (引火包或閃光包) means a soft plastic bag containing a small quantity of black powder charge or other pyrotechnic materials and loaded with an electric match. It is usually used with flammable liquids or LPG to guarantee their ignition.

**Flash cotton** (閃光棉) means a pyrotechnic material with properties similar to flash paper but with a faster burning rate.

**Flash paper** (閃光紙) means paper treated with nitro-cellulose. It is extremely sensitive to heat and produces a brief flash of fire upon ignition without solid by-products.

**Flash pot** (閃光罐) means a device used with flash powder that produces a flash of light and is capable of directing the flash in an upward direction.

**Flash powder** (閃光粉) means a pyrotechnic material intended for use in firecrackers and salutes, and often used for “flash” type effects. Flash powder produces a flash of light when ignited and in some cases an audible report.

**Flash string** (閃光繩) means a pyrotechnic material with properties similar to flash paper.

**Fog effect (霧化效果)** means a type of fog, smoke or mist produced from a variety of fog producing machines and equipment.

**Fountain (花筒噴花)** means a cone-shaped or cylindrical pyrotechnic device. Fountains are normally set off on the ground producing a controlled spray of sparks.

**Fuse (引火線)** means a flexible cord containing solid pyrotechnic materials by which fire or flame is conveyed at a continuous and uniform rate.

**Gerb (花筒)** means a pre-assembled pyrotechnic device, usually of a cylindrical shape, designed to produce a controlled spray of sparks with a reproducible and predictable duration, height, and diameter.

**Gun powder (黑火藥)**, see black powder.

**Hard pilot (硬火苗)**, in relation to the use of LPG equipment, means the ignition of LPG by fire or flames produced by a pyrotechnic material or by other means.

**Hazardous debris (危險碎片)** means any debris, produced or expelled by the functioning or malfunctioning of any special effects material, that is capable of causing personal injury or unintended property damage. This includes, but is not limited to, hot sparks, heavy casing fragments, duds, misfired pyrotechnic materials and unignited components. Materials such as confetti, lightweight foam pieces, feathers, or novelties, are not to be construed as hazardous debris.

**Holder (盛器)** means any device used to hold a pyrotechnic material other than a mortar. The purpose of a holder is to maintain the position of a pyrotechnic material. A holder is not to be construed to be a mortar.

**Igniter (點火器)** means an electrical, chemical, or mechanical device normally used to discharge special effects materials.

**Igniter cord (導火索)** means a cord containing slow-burning pyrotechnic materials which is mainly used to ignite other pyrotechnic materials or flammable materials.

**Integral mortar (整合爆斗)** means a mortar preloaded with pyrotechnic materials and is intended for a single firing only.

**Isolated power supply** (獨立供電裝置) means an ungrounded power supply that provides electricity, in which both output wires are isolated from ground. An isolated power supply can be an ungrounded generator, an ungrounded dc-to-ac converter, or commercial power supplied through an isolation transformer.

**Licensed supplier** (持牌供應商) means a person who is the holder of a pyrotechnic special effects materials supplier licence issued under section 19 of the Ordinance.

**Lifter** (升舉彈) means a wrapped black powder charge with an igniter. Lifters are usually fired in a mortar to simulate an explosion or as a lifting charge. The casing of a lifter is made of soft materials such as cardboard and is usually wrapped with several layers of friction tape. Extra wrapping will add to the confinement and subsequent explosion effect. Lifters are also known as black powder bombs.

**Lifting charge** (升舉彈藥) means a pyrotechnic material designed to propel (lift) objects or other pyrotechnic materials into the air when ignited. It usually consists of a black powder charge and is used with a mortar tube.

**Liquefied petroleum gas** (石油氣), as defined under section 2 of the Gas Safety Ordinance (Cap. 51), means any gas which is a mixture of –

- (a) hydrocarbons primarily consisting of butanes, butylenes, propane or propylene; or
- (b) all or any of the hydrocarbons referred to in paragraph (a).

**LPG** (石油氣), an abbreviation for liquefied petroleum gas.

**LPG equipment** (石油氣設備) means equipment involving the use of liquefied petroleum gas to produce flame, fire, fireball or explosion effects.

**LPG mortar** (石油氣爆斗) means an LPG equipment used to produce fireball effects through the ignition of LPG rapidly released from its accumulator. It may operate without the use of any pyrotechnic material.

**Lycopodium** (石松粉) means the spores produced by the genus of mosses called lycopodium. This powdery, organic, yellow material can be agitated and dispersed mechanically into a cloud and then ignited by a spark, pilot flame, or electrical heating device. Although not a pyrotechnic material, this material is used by special effects operators to produce fire effects or in conjunction with other pyrotechnic materials to create a special effect.

**Material** (物料), as defined under section 2 of the Ordinance, includes –

- (a) a substance whether in the form of a liquid, vapour or solid;
- (b) a mixture of substance; and
- (c) article or device containing one or more such substance.

**Maximum service pressure rating** (最高許用壓力) means the maximum pressure of an LPG equipment which must not be exceeded during use.

**Mine** (地雷煙花) means a pyrotechnic device, usually pre-assembled, that projects multiple pellets of pyrotechnic materials producing sparks or flame. It is usually supplied with an integral mortar.

**Model rocket engine** (火箭引擎模型) means a commercially manufactured, non-reusable rocket propulsion device which is constructed of a nonmetallic casing and solid propellant, wherein all of the ingredients are self-contained so as not to require mixing or handling by the user and which have design and construction characteristics to provide a reasonable degree of safety to the user.

**Mortar** (爆斗) means a tube or a pot-like device used to direct and control the effects produced by the discharge of special effects materials contained therein.

**MSPR** (最高許用壓力), an abbreviation for maximum service pressure rating.

**Naphthalene** (萘) means a white, crystalline, volatile material in flake or granular form having a mothball odour that gives off flammable vapours when heated. These vapours form a flammable mixture with air. It is a non-pyrotechnic material. When it is mixed with black powder and used in conjunction with a lifter, a fireball effect can be produced.

**Net explosive quantity (爆炸品淨量)**, as defined under section 2 of the Ordinance, in relation to pyrotechnic special effects materials –

- (a) means the net weight of the chemical material in a pyrotechnic special effects material designed to produce heat, gas, sound, light, or a combination of these effects resulting from a self-sustaining and self-contained exothermic chemical reaction by combustion, deflagration or detonation;
- (b) does not include the packaging, wiring or casing in which such chemical material is contained.

**Non-electric detonator (非電雷管)** means a detonator that does not need electric energy to function.

**Non-PSEM (非煙火特別效果物料)**, an abbreviation for non-pyrotechnic special effects material.

**Non-pyrotechnic special effects material (非煙火特別效果物料)** means any material specified as non-pyrotechnic special effect material in the Special Effects Materials List Regulation.

**Notifiable occurrence (須具報的事件)** means any occurrence notifiable under section 40 of the Regulation.

**Operator-in-charge (負責人)** means a licensed special effects operator –

- (a) in the case of a discharge permit, responsible for the use of special effects materials within the terms and conditions of the discharge permit;
- (b) in the case of a pyrotechnic special effects materials supplier licence, responsible for the safety management of the activities incidental to the licensed supplier; or
- (c) in the case of a store licence, responsible for the safety management of the storage of the pyrotechnic special effects materials.

**Package (包裹)**, as defined under section 2 of the Regulation, means the packaging and the pyrotechnic special effects materials contained therein.

**Packaging** (包裝用品), as defined under section 2 of the Regulation, means any receptacle and any other component or material necessary for the receptacle to perform its containment function.

**Pan type mortar** (盤狀爆斗) means a shallow metal container that is used to hold special effects materials.

**Performer** (表演者) means any person active in a special effects scene excluding the audience or support personnel. Performers can include, but are not limited to, actors, singers, musicians, dancers, stunt performers and acrobats.

**Photoflash flash powder** (閃燈閃光粉) means a pyrotechnic material that yields a very large amount of light for a small fraction of a second on ignition.

**Pneumatic capsule launcher** (充氣式彈囊發射器) means an instrument designed and used for expelling a projectile by pneumatic means for the purpose of creating visual or audible special effects in motion picture, television, and theatrical productions. Pneumatic capsule launchers are controlled under the Firearms and Ammunition Ordinance (Cap. 238).

**Pre-assembled** (已組裝), in relation to pyrotechnic materials, means a pyrotechnic material or device which has been measured, compounded, assembled, packaged, prepared for ignition and labelled prior to its delivery to the firing venue.

**Prescribed** (訂明) means prescribed by regulations made under section 26 of the Ordinance.

**Producer** (監製) means an individual who has the overall responsibility for the operation and management of an entertainment programme, which includes, where applicable, the production of any entertainment special effects. Generally, the producer is an employee of a film company, promotion company, advertising company, entertainment company, festival, theme parks, or other entertainment group.

**Propane (丙烷)** means a type of fuel gas used with an LPG equipment to produce special effects. Under the Gas Safety Ordinance (Cap. 51), liquefied petroleum gas means any gas which is a mixture of hydrocarbons primarily consisting of butanes, butylenes, propane or propylene, or a mixture of all or any of these hydrocarbons.

**Propylene (丙烯)** means a type of fuel gas used with an LPG equipment to produce special effects. Under the Gas Safety Ordinance (Cap. 51), liquefied petroleum gas means any gas which is a mixture of hydrocarbons primarily consisting of butanes, butylenes, propane or propylene, or a mixture of all or any of these hydrocarbons.

**PSEM (煙火特別效果物料)**, an abbreviation for pyrotechnic special effects material.

**Pyrotechnic device (煙火裝置)** means a device containing pyrotechnic materials.

**Pyrotechnic material (煙火物料)** means a chemical material which is designed to produce heat, light, sound, gas, smoke, or a combination of these effects as a result of a self-sustaining and self-contained exothermic chemical reaction by combustion, deflagration or detonation.

**Pyrotechnic special effects material (煙火特別效果物料)** means any material specified as pyrotechnic special effects material in the Special Effects Materials List Regulation. All pyrotechnic special effects materials contain pyrotechnic materials.

**Quick match (快燃引火線)** means a black match that is encased in a loose-fitting paper sheath. Although exposed black match burns slowly, quick match burns extremely rapidly and almost instantaneously.

**Register (登記冊)** means the register of pyrotechnic special effects materials kept in accordance with section 17 of the Ordinance.

**Registered pyrotechnic special effects material (已登記煙火特別效果物料)** means any pyrotechnic special effects materials listed in the register.

**Rocket (火箭)** means a pyrotechnic device that moves by the internal combustion of propellants.

**Safety fuse** (安全引|火線) means a flexible cord containing pyrotechnic materials by which fire or flame is conveyed at a constant and relatively uniform rate from the point of ignition to the point of use.

**Salute powder** (響藥) see sonic flash.

**Saxon** (風車煙花) means a pyrotechnic device consisting of a tube that rotates around a pivot point to produce a circular shower of sparks.

**SEM** (特別效果物料), an abbreviation for special effects material.

**Shaped charge** (錐形裝藥) means a pyrotechnic device with a hollow space or cavity used or manufactured with a view to perforating into steel or other hard objects by means of detonation.

**Shock tubing** (非電引爆索) means a small-diameter plastic tube containing a small amount of pyrotechnic materials. The energy transmitted through the tube by means of detonation wave is guided through and confined within the walls of the tube. It is also used to simulate lightning strikes.

**Shunt** (封線尾) means a deliberate short-circuit of an electrically fired pyrotechnic device or a means contained within its firing system to protect it from accidental ignition by extraneous electricity.

**Simulated phosphorus** (模擬磷) means a pyrotechnic device that produces the effect of stars or burning phosphorus.

**Smoke composition** (煙霧成分) means a pyrotechnic material made in various forms, most often granular or powder, and comes in various colours when ignited. It can be fired manually either with an open flame, fuse, or heated surface, or electrically, with a squib.

**Smoke pot** (煙霧罐) means a pyrotechnic device which contains smoke compositions and is used to create smoke.

**Smokeless powder** (無煙粉末) means a pyrotechnic material of a mixture of nitrocellulose and nitroglycerin and/or nitroguanidine.

**Soft detonator (軟殼雷管)** means a detonator with no metallic elements or jacket.

**Soft pilot (軟火苗)**, in relation to the use of LPG equipment, means the ignition of LPG by spark gaps or any other means not involving hard pilot.

**Sonic flash (聲波閃光粉)** means a kind of flash powder specifically formulated to produce a loud concussion effect. It includes salute powder, extra-fast flash, concussion flash powder.

**Sparkle flash powder (火花閃光粉)** means a kind of flash powder that produces a bright flash of light and a shower of sparks when ignited.

**Sparkle pot (火花罐)** means a device intended to contain and control the discharge of sparkle flash powder.

**Special effects material (特別效果物料)** means any of the material specified in the Special Effects Materials List Regulation. It is either listed as a pyrotechnic special effects material or as a non-pyrotechnic special effects material.

**Special effects operator (特別效果技術員)** means a person who uses special effects materials for producing entertainment special effects. It includes a special effects assistant.

**Special effects operator licence (特別效果技術員牌照)** means a licence issued under section 6 of the Ordinance.

**Squib (爆管)** means a small, electrically fired pyrotechnic device consisting of an electric match plus a charge of pyrotechnic material and made in various sizes. It is used for many applications such as ignitors, small flame projectors, noise effects and bullet hit effects.

**Stars (光珠)** means small masses of pyrotechnic materials that are projected from aerial shells, mines, or roman candles. Stars burn while in the air, producing colour or streamer effects.

**Store licence (貯存所牌照)** means a licence issued under section 24 of the Ordinance for the storage of pyrotechnic special effects materials.

**Stunt (特技)** means a calculated performance of dangerous act or action performed by an actor who is a specially trained stunt performer.

**Stunt performer (特技演員)** means a performer or actor who is trained and experienced to carry out and perform a stunt.

**Support personnel (支援人員)** means any individual who is not a performer or member of the audience or the general public. Among others, support personnel include the production crew, camera crew, special effects operators, stage hands, property masters, security guards, fire watch officers, janitors, or any other employees.

**Trail powder (慢燃粉末)** means a kind of slow-burning pyrotechnic material in granular shape used to simulate the effect of burning a trail of black powder or a fuse.

**Trunnion mortar (鐵通爆斗)** means a device used to produce bullet hit effects. It is made of steel tube and mounted on a steel plate adjustable to different angles and is loaded with an appropriate squib and a glass or steel ball. The firing of the squib causes the glass or steel ball to be ejected from the tube with sufficient momentum to pierce through a window leaving a round hole like bullet.

**Two component flash powder (二元閃光粉)**, see binary system flash powder.

**Use (使用)**, as defined under section 2 of the Ordinance, in relation to special effects materials, includes assembling, handling, mixing, compounding, installing and discharging.

**Vessel (船隻)** means a vessel within the meaning of section 2 of the Shipping and Port Control Ordinance (Cap. 313).

**Waterfall (瀑布煙花)** means an effect of a cascade of sparks that are usually produced by multiple pyrotechnic devices fired simultaneously.

**Wheel (車輪煙花)** means a pyrotechnic device that rotates on a central axis consisting of multiple gerbs or rockets attached to a framework.