





GUIDANCE IN THE PROVISION & SAFE OPERATION OF CAMERA CRANES











FOREWORD

The first edition of the "Crane Guidance" was published in 2002 and quickly came to be recognised as the industry standard for the safe operation of cranes. This new, revised version has been updated and amended to reflect legislative changes, the availability of new equipment and evolving work systems. As with the first edition, the intention has been to encourage and support safe, professional and legally compliant crane operating practices for the benefit of the individuals working within the film, digital, TV and broadcast industries.

Thanks to generous sponsorship, this guide is available free of charge to those working full-time in the industry and can also be downloaded from the ASPEC and PLASA websites:

www.plasa.org/aspec

www.aspec-uk.com

ACKNOWLEDGEMENTS

There were so many people involved in this updated version of the "Crane Guidance" that it would be impossible to thank them all individually. This is an industry that understands the need to take a lead on safeguarding the people that work within it and the importance of ensuring that the highest safety standards are met. It goes without saying that help was given generously and willingly with a view to building on the sterling work that made the first edition possible.

HSE SUPPORT



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INTRODUCTION

This guidance has been produced to support the safe operation of crane equipment within the broadcasting and film industry. Within its scope this guidance will attempt to draw out the key legal requirements from the:

- Health and Safety at Work Act 1974
- Management at work Regulations 1992
- Health and Safety (young Persons) Regulations 1997
- Provision and Use of Work Regulations 1998
- Lifting Operations and Lifting Equipment Regulations 1998
- Supply of Machinery (Safety) Regulations 1992
- BS7121, Safe Use of Cranes

It is not the intention of this guidance document to give legal interpretation but to provide best practice in the use of cranes within the broadcasting and film industry. Consultation with current legislation and approved codes of practice may still be required depending on the work being undertaken.

For the purpose of this document the term "crane" covers any camera support equipment with a counter balance arm including Jibs.

This guidance will cover the following five areas that affect the safe operation of cranes:

- ROLES AND RESPONSIBILITIES
- CRANE EQUIPMENT
- STRENGTH AND STABILITY
- PLANNING THE USE OF CRANE EQUIPMENT
- CORRECT USE OF CRANE EQUIPMENT



ROLES AND RESPONSIBILITIES

RELATIONSHIPS

Where there may not be a direct 'employment' relationship between the technician operating the crane and the persons who control the use of the crane equipment, where a grip/crane technician operating the crane carries out work on a client's production with crane equipment provided by that person or a third party:

- (a) Employers (whether individuals, partnerships or companies) have a duty to ensure that crane equipment provided for their production team and the self-employed working for them complies with the detailed regulations and industry best practice;
- (b) Freelancer must comply with the same duties in respect of crane equipment that they use in the studio or on location. It is highly recommended that all crane technicians carry out a full check on the crane to be used prior to using it on any shoot.
- (c) Employers who take control of crane equipment or its management or the way it is used also have duties as far as their control permits. For instance, those hiring out cranes may, in practice, have some control over the way the crane is used or maintained by their customers. Alternatively, employers may provide all crane equipment to others working on their premises and they clearly have some control over the equipment provided.

Note:

A competent crane technician should attend a crane at all times, supported by two NVQ Certified Grips, with at least one grip being NVQ III level.

The crane hire company must ensure that when a crane is hired out, physical evidence accompanies it, such as a copy of the last examination report (the technician operating the crane should ensure that this evidence is available) and the Instruction Manual/SWL/Serial Identification No.

- Only competent, correctly trained NVQ technicians must operate cranes
- After assembly of a crane the technician operating the crane should ensure that the crane is thoroughly examined before it is put into use to make sure it is safe to operate.
- All cranes must be checked on return from hire and any maintenance work signed off before re-hire.
- A formal hand-over certificate should be used to support this process.



that:

CRANE EQUIPMENT

SUITABILITY OF CRANE EQUIPMENT

When selecting lifting (crane) equipment, it should always be taken into account any principal ergonomic hazards associated whilst operating the crane.

Crane design should take account of the size and shape of an operator using the crane and ensure that the crane is compatible with a persons dimensions / weight

- Operating positions/working heights/reach distances etc.
- Can the crane be adapted to accommodate the intended operator technician?
- Operation of the equipment should not place undue strain on the technician operating the crane.
- Operator, technicians or grips should not be expected to exert undue force, stretch and reach beyond their normal strength or physical limitations to carry out tasks.

MEANS OF ACCESS

Consideration needs to be given to all parts of the crane equipment to which access may be required, regularly or irregularly, and to the people who need this access.

If any modifications are considered necessary in order to provide a permanent means of access to the lifting equipment, and these are liable to affect the strength and stability of the equipment, Advice must be sort from the manufacturer or supplier before any such modifications are made.

PROTECTION AGAINST SLIPS. TRIPS AND FALLS

This applies to those parts of the crane equipment where people may need to be present in order to operate, maintain, inspect and/or carry out repairs. The following applies:

- When using crane equipment in locations where the accumulation of liquids, cables or dust may pose a risk of slipping/tripping, all practical preventative measures must be taken.
- Routine checks must be taken to ensure that effective control measures remain adequate.
- If there is a danger from falling persons or materials from a static platform, then guard rails and kick boards must be in place.



The crane technician has the duty to operate the subsequent lifting (crane) operations in a safe

manner The crane user (as an employer or a self-employed person) also has the duty to ensure

• The crane user may well come to an arrangement with the hirer under which the hirer

carries out the thorough examinations but that does not alter the crane user's duty to

will undertake the lifting operation on their behalf; i.e. the hire company provides the crane and the technician, the crane owner has the duty to ensure that the crane is

A summary of the roles and responsibilities of parties involved in crane operation is detailed in

• Where a production company enters into a contract with a crane hire company who

properly maintained, examined and safe to use and that any crane operation are

• The periodic thorough examinations are undertaken at the frequencies identified

through risk assessment or an examination scheme in place.

make sure these are carried out prior to use.

carried out safely.

Appendix D





EFFECTS OF HIGH WIND

Crane equipment used in open-air locations can potentially become unstable if used in high wind conditions. The maximum wind speed in which the lifting equipment can be used must be provided. *(appendix C)* Measures therefore need to be in place to determine the wind speed and also reduce its effect.

- The weather forecasting services will provide a general idea of the expected wind conditions on a day-to-day basis for a particular area.
- Appendix C provides general guidance for the safe use of cranes in various wind speeds (the manufactures instruction on wind speeds must be used where provided). If wind speeds exceed these guidance or manufactures instructions, then crane activities must cease.
- The most common way of providing an instantaneous indication of the wind speed is to use a hand-held anemometer. However, this method may not give an accurate indication of the wind speed in the most exposed position.
- There may be some instances where the wind could also affect the stability of crane equipment used indoors. This could be the case where studio doors are opened allowing the wind to 'funnel' through a building, therefore the stability of lifting equipment should be taken into account if such situations arise.
- The Production Company is ultimately responsible for the safe operation of cranes in all conditions.
- Appendix A: Crane Hazard Check List, provides further guidance to manufactures and users of cranes.





- Where edge protection cannot be provided or where operators are using mobile elevating work platforms then a suitable mounting and appropriate safety harness should be used (safety assistance should be sought where needed).
- Situations where there is a potential fall of less than 2m may also require edge protection to be provided, for example:
- (a) Where traffic route passes close to the edge of the crane equipment;
- (b) Where large numbers of people are present;
- (c) Where a person might fall onto a sharp or dangerous surface or material/substance;
- (d) Where a person might fall into fast flowing or deep water;
- (e) For shooting, crane erection or maintenance then appropriate safety equipment must be used to prevent falls.

OPERATOR PROTECTION

In certain circumstances some form of protection may be needed to protect personnel from risk associated with the location environment. Situations where protection would be necessary include where the operator of the crane is exposed to:

- Water, falling objects, pyrotechnics.
- The weather; eg. lightning
- The possibility of being struck by vehicles
- Levels of noise/dust/smoke that could damage their health

The exact nature of any personnel protection will depend upon the nature of the hazards to which the personnel are exposed and the risks these hazards present. Those nominated as being responsible for providing any protection will need to consider:

- (a) The operator's visibility of the task.
- (b) The suitability of the protection being provided.
- (c) If the operation is taking place in a hot or cold environment
- (d) Whether it is ergonomically suited to the operator.





STRENGTH AND STABILITY

ADEQUATE STRENGTH

The crane equipment should have adequate strength but particular attention must be taken into the mounting or fixing points.

- The mounting or fixing points to include where the crane equipment is secured to another surface and also where parts of the crane equipment are fixed together: e.g. two jib sections of a crane.
- In addition to the downward and upward reaction force of the weight of the load, consideration must be given to additional forces, eg. wind loading, since this may place extra stresses on the crane equipment.
- Modifications to crane equipment may affect the wind loading.
- Careful consideration of the risks that may arise from such changes to the wind loading and the potential effect on the stability of the crane equipment.
- Dynamic loading from the rapid acceleration/deceleration of either the whole crane structure or the suspended load must be considered
- A competent person should ensure that the strength and stability of the crane equipment continues to be adequate for the tasks that the equipment is to be used for.
- For difficult or unusual lifts, the supplier or manufacturer of the crane equipment may need to be contacted to ensure that it is strong enough for the proposed use.
- Safe working load must be indicated on all cranes & crane accessories and these limits must be strictly adhered to.

SAFE WORKING LOADS (SWL)

A 'safe working load' (SWL) is a value or set of values based on the strength and/or stability of the equipment when lifting. A range of safe working loads can be specified for the same equipment when used in different configarations. The SWL is usually expressed in terms of the maximum load that the crane and attachments may safely lift, they must NEVER be exceeded

 Where the safe working load (SWL) of a crane is not known then you must ensure that this equipment is not used until this value is determined. This may mean that you need to contact the manufacturer or supplier or alternatively arrange for the equipment to be thoroughly examined by a competent person.

ADEQUATE STABILITY

A number of factors can affect the stability of the crane. These include:

- (a) The strength of the ground or surface on which the crane equipment is positioned or located, e.g. spreader plates or sub-frames may be needed so they can safely support the weight of the equipment and the maximum load to be lifted;
- (b) Stability of the surface under load conditions, eg. if the lifting equipment is too close to level changes the ground may slowly subside or collapse suddenly;
- (c) Cranes must only be operated in a level position;
- (d) The size and nature of the equipment/load (eg. whether the load itself is unstable);
- (e) How the equipment/load is intended to be lifted; and
- (f) The maximum wind loading that may occur.
- (g) Dynamic effects eg. centre of gravity change, centrifugal forces etc...

You can use various methods or combinations of methods to improve the stability of lifting equipment. These include:

- (a) Designing a suitable sub-frame/tubular rigging on which to position the crane equipment. (The base must be able to demonstrate that it is adequate to support operating load of the crane);
- (b) Using an anchorage system (must be approved by supplier/manufacture before use;
- (c) Using counterbalancing weights;
- (d) Using recognised ballast, outriggers or stabilisers.





Where cranes are anchored to other work equipment or structures checks should be made to ensure that the equipment or structure can withstand the forces that the crane and its use will impose on them ie. putting one crane onto another, tracking cars to achieve fast moving shots.

FLOATING VESSELS

- If the crane is situated on a floating vessel it will be effectively operating on a variable out-of-level base and thus subject to significantly different loading conditions than is the case on firm level ground.
- In addition, the distance between the water level and the deck of the floating vessel will vary as the lifting operation is carried out. Vessel should be fitted with an inclinometer and a competent body should determine maximum angle of heel for vessel/crane combination. Also position of the crane on a vessel will have an effect, i.e. crane mounted in the centre of a vessel will be more stable than one on the side.
- Such crane lifting equipment will be subject to greater dynamic loading than when used on land. For example, for a crane there will be increased side loading on the crane arm and greater forces in paning due to changes in inclination of the vessel.
- The crane may therefore require it to be de-rated from its normal land-based duties. A competent person, based with details from the crane manufacturer's recommendations for floating duties, should determine the extent of such de-rating.
- If on occasions the camera needs to go under water, consideration must be given to the effects the buoyancy will have on ballast weight calculations.

CRANE EQUIPMENT USED ON TRACKS

Ground settlement can cause tracks to be become misaligned and the running surface to become uneven. such settlement must not be allowed to develop to the extent that the crane can become unstable or liable to be derailed in use.

- Only use track specified for the crane
- Track to be stored and maintained to manufactures/suppliers recommendations
- Cranes over 2 meters must not be used on curve track.

MOBILE CRANE EQUIPMENT FITTED WITH PNEUMATIC TYRES

Solid tyres for mobile crane equipment is strongly recommended, however, where pneumatic tyres are being used the following must apply:

- Tyre pressures are checked before use and then on a regular basis.
- Use of an appropriate pressure gauge that can be calibrated to confirm that the pressures meet manufacturer/suppliers recommendations.
- Pneumatic tyres should have inner tubes.
- Crane should be lowered to a safe position before checking tyre pressures in case the valve jams or fails.

PREVENTING OVERLOAD

- To prevent the risk of overturning and/or overloading arising from the use of a crane, strict compliance to design specification is required.
- Regular checks of wind speeds, ground conditions and/or supporting structures should be carried out prior to use to ensure full operating stability.
- Manufactures safe working load is NEVER to be exceeded.

POSITION AND INSTALLATION

As part of the planning requirements liaison with the NVQ III certified Grip must be carried out to address the following:

- Installation or position to ensure that the risks of the equipment, or its load, injuring people is minimised.
- Measures are in place to control any risks, these will depend upon the type of crane, where and how it is used etc.
- The dimensions of any access passageways or paths are sufficient so that any persons using them will not be put at risk from any crane operation.
- Any gap into which persons may enter, which may be reduced, for example, by a crane operating motion, should be at least 0.5m and preferably never less than 0.6m.
 coverage or restriction to such a passageway may be required to help protect persons should the crane arm drop unexpectedly.



PLANNING THE USE OF CRANE EQUIPMENT

RISK ASSESSMENT

A risk assessment will identify the hazards and corresponding risks.

The degree of planning to control these risks will vary considerably, and will depend upon the type of crane to be used and the complexity of the crane operation for which it will be used and the environment it will be used in. Consultation with the NVQ III Certified Grip is critical in the planning process.

Proper planning of crane operations is a combination of two parts:

- (a) Initial planning to ensure that a crane is provided which is suitable for the range of tasks that it will have to carry out;
- (b) Planning of individual crane operations so that they can be carried out safely with the crane provided.

The balance between the two parts of the planning process will also vary depending upon the crane and the particular crane operation.

INITIAL PLANNING

Initial planning must be considered at the first point of enquiry and should be encompassed within an organisation's hire/use procedures.

Factors taken into account when selecting crane equipment so that it is suitable for the proposed task include:

- (a) The operational task
- (b) Type of loads (person/camera/other)
- (c) Restrictions (height, lateral movement etc.)
- (d) How often the crane equipment will be used to carry out the task.
- (e) The environment in which the crane equipment will be used.
- (f) The personnel available to operate the crane and their knowledge, training and experience. (*Appendix G*)

The competent person required to carry out the planning must be able to demonstrate that they have adequate knowledge and experience within the broadcasting and film industry to carry out the planning requirement.

PREVENT A MOVEMENT IN UNCONTROLLED MANNER

This requirement aims to ensure that crane movements and loads are under control at all times to minimise risks to persons in the vicinity of the crane operation. To prevent uncontrolled free fall of the crane or its load, various methods can be used to minimise the risk from the crane falling out of control.

These include but not exclusive too:

- 1. Unless detailed by manufacturers instructions or a risk assessment, two NVQ III Grips (the second grip can be NVQ II Certified) and one NVQ II Crane Technician should be in attendance when operating a crane (one grip at each end of crane). See *Appendix G*.
- 2. Safety equipment available and used to ensure effective strapping and bonding of camera and heads.
- 3. Lifting mechanisms with a high factor of safety or strength must be operated in line with manufactures recommendations.
- 4. Safety Clothing: Personal Protective Equipment must be worn when operating any camera crane.
- 5. Final check to be completed by the crane technician and NVQ III grip to cover:
 - Operating area
 - Track/Mountings/sub-frames (Check for settling)
 - Weights
 - Strapping/Bonds
- 6. Crane equipment, which is designed for lifting people, must be clearly and appropiately marked that it is for lifting persons.
- 7. The risk assessment carried out in line with the Management Regulations will help select lifting equipment and assess its suitability for particular tasks.
- 8. Appendix A: Crane Hazard Check List has been designed for guidance.

Note: Persons involved with crane risk assessment must be able to demonstrate competence and should be NVQ III Certified.



For routine crane operations the planning of each individual crane operation will usually be a matter for the NVQ III Certified Grip using the crane equipment, to help support the planning process it is good practice that the grip be involved in the location reconnaissance.

The grip carrying out this part of the planning exercise should have a NVQ III certification and have appropriate knowledge and expertise.

VISIBILITY

- If the technician is unable to maintain a clear view of the path of the load then the grips will assist. The grips will need to be in a safe position and either be in view of the responsible person or able to communicate effectively with them.
- The crane technician needs to use the same reliable means of effective communication. This could be by using hand signals, radios or telephones etc.
- Where hand signals are used they should be consistent with the code of signals in Schedule 1 of the Health and Safety (Safety Signs and Signals) Regulations 1996.

ENVIRONMENT

- Various weather conditions could have an effect on the integrity of the equipment or expose persons to danger which may mean that the crane operations have to be stopped, eg. excessive wind speed, poor visibility due to mist or fog, lightning, heavy rain, sea state etc.
- Other factors may produce unsafe conditions after the particular weather condition has finished, e.g Waterlogged and unstable ground following a period of heavy rain.
- A safe system of work needs to be in place which sets out what measures or action needs to be taken for particular weather conditions.
- Such systems of work need to recognise that additional measures may be needed to reinforce the stability of the crane or to reduce the safe working load so that the crane operations can be continued safely.

LOCATION

• Adequate site access and egress for the equipment must be available, sufficient space to safely position and install needs also to be established



CORRECT USE OF CRANE EQUIPMENT

OVERTURNING

A crane must never be used unless it is of adequate strength and stability for the operation required. It must be established that the technicians and grips who use the crane have sufficient knowledge to judge whether or not the equipment is likely to be over-stressed or become unstable while they are using it.

This could arise, for example:

(a) When turning a crane with a raised load.

- (b) Persons riding the crane when re-positioning.
- (c) During excessive and uneven loading.
- (d) When using a crane to lift an unknown load, and using a crane in excessively high winds or in locations where traffic (mechanical or human) could collide with it.
- (e) Unknown ground conditions.

Crane equipment <u>MUST NOT</u> be operated whilst under the influence of alcohol, certain medication (seek medical advice) or drugs, high levels of stress or when fatigued.

The crane technician operating the equipment must be aware of the risks associated with the designated task and avoid overloading the equipment.

For crane equipment which travels in a raised position, consideration of the layout, ground conditions and overhead obstacles of the studio/location must be made to ensure that the possibility of it overturning or hitting an overhead obstruction are minimised.

PROXIMITY HAZARDS

Measures are required to address the risks arising from proximity hazards. These measures need to take into account the crane equipment in use and the particular proximity hazard. Proximity hazards that you will need to consider include:

- (a) Coming into contact with overhead structures, work structures' electrical energy sources;
- (b) Level changes;
- (c) Other operations in the vicinity;
- (d) Low structures;
- (e) If operating near high voltage overhead cables contact needs to be made with the local supplier for direction on safe working distances





(e) Gradients;

(f) Scenery/support lines;

(g) Ground services such as cables;

(h) Change in ground conditions ie. beaches, tide changes or causeways.

The measures needed to be taken will depend upon the particular kind of crane and hazards.

DE-RATING

Although a safe working load may be marked on a piece of crane equipment, it may be necessary to reduce this value to take into account where and how the equipment is being used. This is often referred to as 'de-rating'. those involved in crane operations must have the knowledge and experience to know when this may be necessary for example this would be used on boats, man riding, tracking vehicles etc.

LIFTING OF PERSONS

Adequate precautions should be taken when using Crane Lifting equipment specifically designed for lifting people including:

- The safe working load for the equipment and accessories should be reduced (de-rated) by a suitable amount (such as 50%) to provide an appropriate factor of safety, a NVQ III Certified Grip will be able to provide advice.
- Where the distances between the person being lifted and the person controlling the lifting operation are short then verbal communication may be used.
- Seat belts to be used at all times
- The NVQ III Grip to be in control who mounts and dismounts and when.
- Where distances mean that the people involved cannot hear each other then the need to provide the personnel involved a reliable means of communication needs to be in place. This could be based on a system of hand signals, a radio, telephone or dedicated hands free crane communications systems.
- Certain cranes used for man riding may incorporate a number of safety features to prevent free fall (guidance from the manufacturer / supplier should be provided).

PRE-USE CHECK

All personnel who use crane equipment must have received appropriate training, information and instruction so that they can carry out pre-use checks on the crane lifting equipment. (*Appendix B* refers)

The purpose of these pre-use checks is to **help** identify faulty equipment and initiate corrective actions where appropriate.

- The crane technician and or NVQ III grips are best placed to identify any faults or damage to equipment.
- The crane technicians / NVQ III Grip operating the crane equipment should act as the first line of defence in identifying any faults or damage.
- The following checks should be carried out:

(a) Before the crane is used by each working day.

(b) At the beginning of each shift.

(c) left unattended for any period of time

- The aim of such checks is to pick up faults due to day-to-day wear and tear and malfunction of safety-related equipment. If any defects are found the technician must report the defect or, if competent to do so, take appropriate action to rectify it.
- Persons carrying out the checks must be able to identify damage to crane and crane accessories/equipment

CONTINUING INTEGRITY

• The Crane equipment is required to be maintained in an efficient state and safe working order and in good repair at all times.

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• All lifting accessories/equipment must be suitably stored away after use so that they are not damaged. This may require the provision of suitable storage facilities such as a storage rack or container.



APPENDIX A : CRANE HAZARD CHECKLIST

DEFINITIONS

WORK EQUIPMENT:

Machine, appliance, apparatus, tool assembly of components which are arranged so the function is as a whole.

USE:

Any activity involving work equipment and includes starting, stopping, and programming, repairing, modifying, maintaining, servicing and cleaning.

THOROUGH EXAMINATION:

Examination by a competent person including testing the nature and extent of, which are appropriate for the purpose, described in the statutory regulations.

INSPECTION:

Visual or more rigorous inspection by a competent person as is appropriate. It also includes testing the nature and extent for the purpose.

LIFTING EQUIPMENT:

Work equipment for lifting or lowering loads and includes its attachments used for anchoring, fixing and supporting.

LIFTING OPERATION:

An operation concerned with the lifting or lowering of a load.

LOAD:

including but not exclusive to personnel, lamps, cameras and remote heads

ACCESSORY FOR LIFTING:

Any work equipment for attaching loads to machinery for lifting

EXAMINATION SCHEME:

A suitable scheme drawn up by a competent person for such thorough examinations of equipment at such intervals as may be appropriate for the purpose described in the regulations.

COMPETENT PERSON:

A competent person can be defined as having the balance of both theoretical and practicable knowledge which they will require to carry out a required task safely and to a determined standard.

Name of item of work equipment:

Serial/Plant Number:



A competent person can be defined as having the balance of both theoretical and practical knowledge which they will require to carry out a required task safely and to a required standard.

It is essential that the competent person be sufficiently independent and impartial to allow objective decisions to be made.

This does not mean that competent persons must necessarily be employed from an external company. If employers and others within their own organisations have the necessary competence then they can use it. However, if they do, they must ensure that their 'in-house' examiners have the genuine authority and independence to ensure that examinations are properly carried out and that the necessary recommendations arising from them are made without fear or favour.

THOROUGH EXAMINATION/TESTING

Thorough examination may be needed at several points during the life of crane: on initial use or following installation.

Periodically during its life, and following certain exceptional circumstances and before use of any item of lifting equipment for the first time, unless physical evidence has been received to the contrary a thorough examination must be be carried out which shows that it is safe to use, this must be thoroughly examined by a competent person. Due to the frequent proximity of crane equipment around third parties and the public, camera crane equipment should be examined at six monthly intervals. *Appendix F* provides appropriate examination and testing guidance in line with current legal requirements.





REQUIREMENT	YES/NO	F
Suitability		
Is the crane suitable by design construction?		
Is the crane suitable for studio environment?		
Is it suitable for production-location requirements?		
Are wheels of a solid type construction?		
Maintenance Is the crane maintained in an efficient state (Health and Safety not productivity), in efficient working order and good repair?		
Date of last statutory inspection and test? (Test Number)		
What are the manufactures' maintenance requirements?		
Are there records of maintenance?		
Is the maintenance log kept?		
Maintenance Operations NB. Maintenance of all cranes must be done in house by qualified technicians and signed off by an appointed Supervisor.		
Has the crane been constructed or adapted to undertake maintenance operations without risk to health and safety?		
Motorised Shafts Is the crane fitted with a means to prevent it seizing?		
Is lubricant undertaken to prevent seizure?		
Inspection Is someone appointed at location to inspect the crane before use?		
Could the crane jeopardise safety?		
Who maintains the inspection records? Are they up to date?		
Thorough Examination and Inspection Has the crane/jib been thoroughly examined before being put into service for the first time?		
Has the crane/jib been examined prior to use after assembly at the onsite location?		
Reports and Defects Does the person making a thorough examination: • Notify forthwith any defects. • As soon as they make the report in writing. • Notify of any defects, which could become a danger to persons, in writing.		
<i>NB. crane/jib must not be put into service before the defects identified have been correctly rectified.</i>		
Keeping Information Are records kept for a minimum of 2 Years?		

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FURTHER ACTION	DESIGNATED PERSON	CLOSE OUT DATE



REQUIREMENT	YES/NO
Specific Risks Does a competent person operate the crane?	
Are specific risks clearly identified, ie. overhead structures etc?	
Information & Instruction Are supervisors and users of the crane provided with adequate health and safety information and instruction?	
Is an instruction manual provided? (Is it current and up to date?)	
Training Have assemblers and users of the crane received adequate health and safety training?	
Has a training needs analysis been undertaken?	
Are training records maintained?	
Are they kept up to date?	
Are personnel made aware of the risks?	
Are personnel made aware of the precautions?	
Conformity with Community Requirements NB. Work equipment provided after 31st December 1992 must conform to relevant legislation, which implements EU Directives (CE marking etc).	
Is the crane "CE" marked?	
Has a declaration certificate been issued with the crane?	
Does the crane appear to be in fact safe?	
Specify any residual risks remaining.	
Dangerous parts of Crane Have measures been taken to prevent access to dangerous parts of the crane/ jib?	
 Have the following measures been taken, so far as is practicable: Fixed guards Other guards Information/instruction/training/supervision 	
Are the guards and protection devices of good construction, sound material and adequate strength?	
Specific Crane Hazards Have appropriate measures been taken to prevent the following hazards: • Falling/overturning • Collapse • Electrocution	



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FURTHER ACTION	DESIGNATED PERSON	CLOSE OUT DATE



REQUIREMENT	YES/NO
Crane Controls & Control Systems Has the crane been provided with one or more readily accessible start/stop controls?	
Are the controls easily and clearly identifiable and visible?	
Are the controls positioned correctly? <i>(eg. in a position that the operator can establish that no one is in a hazardous area before operating a control device).</i>	
Are the interlocking devices suitable and appropriate to the level of risk?	
Are all sources of energy switched off after stopping the crane?	
How are allowances made for crane failures, faults, etc?	
Isolation of Crane from Sources of Energy Has the crane been provided, where appropriate, with identifiable and readily accessible means of isolation?	
Stability Has the crane been stabilised where necessary by acceptable means?	
Lighting Is there suitable lighting supplied for rigging and de-rigging crane equipment?	
Persons Carried on Cranes Are adequate features incorporated in the crane to reduce risk to persons being lifted/carried?	
Have measures be taken to prevent crushing/trapping?	
Can personnel fall from crane?	
Remote Controlled Crane Will the crane mechanism automatically stop if it leaves its control range? (eg. telescopic boom)	
Is there a risk of crushing or impact?	
Reports Is there a system of notification of defects?	
Is there a system of notification of any inspection and test?	
Records Are records of all thorough inspections/examinations kept for 5 years?	
Strength & Stability of Crane Is the crane/jib suitable for lifting on location loads?	
Position and Assembly of Crane Have measures been taken to prevent the crane/jib striking other personnel/ third parties?	



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FURTHER ACTION	DESIGNATED PERSON	CLOSE OUT DATE



REQUIREMENT	YES/NO
Marking of Lifting Equipment Are cranes clearly marked with the safe working load (SWL)?	
Is configuration information ie. extent of limitation of use marked on the crane?	
Does the SWL apply to different configurations?	
Has the crane/jib been examined prior to use after assembly at the site location?	
What defects/hazards can arise from use in potentially hostile environments? (eg. created by special effects)	
Organisation of Lifting Operations Is every lift operation involving the crane/jib: • Properly planned by a competent person? • Appropriately supervised? • Carried out in a safe manner?	
Additional Information Operating Perimeters 1. Wind factor 2. Maximum extension/ie. operating radius/safe working limits	



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FURTHER ACTION	DESIGNATED PERSON	CLOSE OUT DATE

Date of Assessment:	Person carried out assessment:
Date of Assessment Review:	Person carried out assessment review:

Location:Approved by:Date:Location:Approved by:Date:

NB. Please contact your department head or supervisor for this information



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GUIDE TO CRANE OPERATOR TRAINING

APPENDIX B:

INTRODUCTION

To enable cranes to be operated safely and in line with legal requirements, training plays an important part in establishing crane Technician/Grip competence. Training alone will not ensure Technician/Grip competence; suitable experience and supervision all play their part. It is, however, critical that the Technician/Grip undergoes continuous training and development to ensure that best practice is implemented in crane use and that bad practices are eliminated. This guidance document should be used, in conjunction with current legal and industry best practice, to help employers meet their legal obligations to ensure correct complicance

The following criteria are detailed to enable employers to assess current levels of competence within their existing workforce and support future crane technician/ operator development

SPECIFIC AREAS	TRAINING STANDARDS
TRAINERS	Trainers involved in crane operator training must have the following requirements:
REQUIREMENTS	Skilled in training/instruction techniques to recognised level
	Qualified Assessors A1/V1 (Supersedes D32/D33)
	Have recognised experience in film/ broadcasting crane operation
	 Have sufficient depth of knowledge to relate their training to film / broadcasting environments
	These requirements can be met by a combination of trainers
TRAINING ENVIRONMENT	The training environment must be controlled and be located off-the-job to prevent interruptions. On the job development may be required for crane operator assessment. Training facilities should include the following:
	Sufficient space and crane equipment
	Classroom facilities for theoretical work
	Training equipment and aids
	Food & drink facilities
TRAINING	The training should cover the critical areas for crane operation and safety. It should involve both theoretical and practical learning, which will require to be evaluated through assessment. Listed below are specific risk areas where crane operators will require training input:
	CRANE PREPARATION
	1. Ability to assist in undertaking risk assessment.
	2. Carry out visual check and inspection of crane components.
	3. Ensure appropriate test certificates for electrical (PAT Test)/mechanical (SWL)/critical components are in order.
	4. Carry out reporting defects procedure ensuring remedial work is carried out.
	5. Prepare crane components for handling and transport.

LOADING/UNLOADING

- 1. Use of mechanical aids for lifting heavy loads
- 2. Banking of reversing vehicles
- 3. Correct use of truck hoists/other mechanical lifting aids
- 4. Securing crane equipment for travel
- 5. Unloading crane equipment at studio/location

ASSEMBLY

- 1. Assess area for safe operation of crane
- 2. Prepare ground for stability and protect against crane arm striking overhead obstacles
- 3. Correct assembly of track ensuring stability
- 4. Assemble crane in line with manufactures instructions
- 5. Ensuring stability of crane during assembly
- 6. Manual handling best practices
- 7. Bonding techniques
- 8. Levelling a crane
- 9. Crane operator must be competent, having a good working knowledge in constructing temporary platforms
- 10. Correct electrical set-up of crane
- 11. Securing area from damage

CONFORMANCE CHECKS

- 1. Carry out conformance check
- 2. crane must be checked and signed off as ready to rent by in house technician
- 3. Reporting and actioning defects

USE

- 1. Knowledge of crane Technicians /grips duties (Appendix E refers)
- 2. Maintaining safe operating area
- 3. Awareness of studio/location hazards
- 4. Securing procedures when not in use
- 5. Operating with passengers

DISMANTLING

- 1. Preparing area for dismantling
- 2. Correct sequence and tools
- 3. Ensuring stability during dismantling
- 4. Complete post use check



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EFFECTS OF HIGH WIND TESTS

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DEAUFURI	WIND SPEED		SAILOR 3 DESCRIPTION
SCALE	KM/HR	MPH	
0	Below 1	Below 1	Calm
1	1-5	1-3	Light air
2	6-11	4-7	Light breeze
3	12-19	8-12	Gentle breeze
4	20-28	13-18	Moderate breeze
5	29-38	19-24	Fresh breeze
6	39-49	25-31	Strong breeze
7	50-61	32-38	Moderate gale
8	62-74	39-49	Fresh gale
9	75-88	47-54	Strong gale
10	89-102	55-63	Whole gale
11	103-117	64-75	Storm
12	Above 117	Above 75	Hurricane

To summarize, the maximum operational wind speeds for cranes and jib arms of 30ft or less is 25 miles per hour,30ft to 74ft is 15 miles per hour,75ft and above is 12 miles per hour. All safe operating wind speeds are at the discretion of the NVQ III Key Grip and NVQ II Crane Technician.

APPENDIX C:

The following measurements were obtained by exposing a camera crane to the forces produced from a wind machine within a studio environment. It is the intention of this document to illustrate the effects wind forces can have on camera cranes and provide general guidance for safe operation in windy conditions. This document does not replace the specific guidance of the manufacture's instruction manual, which should be consulted when operating crane equipment in windy conditions and considered within a risk assessment.





APPENDIX D:

	SUITABILITY OF CRANE EQUIPMENT
CLIENT TO ENSURE:	 Conformance with essential health and safety requirements ie. "CE" marking under The Provision and Use of Work Equipment Regulations 1998 Regulation 10. Crane and crane equipment has the required examinations and tests. Ensure adequate attention has been given to the suitability of crane with regards to tasks to be undertaken and work environment.
CRANE HIRE COMPANY TO ENSURE:	 Conformance with essential health and safety requirements ie. "CE" marking under The Provision and Use of Work Equipment Regulations 1998 Regulation 10. Ensure cranes comply with the requirements of Provision of Use and Work Equipment Regulations 1998 & Lifting Operations and Lifting Equipment Regulations 1998 (Refer to <i>Appendix A</i>). Ensure that all required tests and examinations have been carried out. (Refer to <i>Appendix F</i>). A suitable maintenance system is in place. A system for monitoring and recording defects whilst in use. Suitable manual /instructions are available.
GRIP TO ENSURE:	 A check is made prior to use to ensure that they are satisfied that the correct crane has been selected, all tests and examinations have been carried out and correct manual/ instructions are available.
CRANE OPERATOR TO ENSURE:	 Technician's safety check has been completed prior to use/re-use. Safety related defects recorded and reported. Not to operate crane with any defects.



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ROLES AND RESPONSIBILITIES

SAFE USE
 An NVQ III Grip is appointed for supervision of crane operations. Two NVQ Certified Grips (one being NVQ III) are in attendance during any crane operations. A Risk assessment is in place for safe use.
 Crane equipment is only used by NVQ III Grip and NVQ II Crane Technician. That crane equipment should only be used once a risk assessment is in place. Instructions/manual have been made available to users.
 Two NVQ Certified grips are in attendance during crane operation. (one being a NVQ III) Competent NVQ II Certified Crane Technician is being used, Requirements from risk assessment have been briefed to team and are being implemented. Adequate supervision is in place. All crane operation is being carried out in line with industry best practice/instruction manual (refer to <i>Appendix E</i>).



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APPENDIX E :

OPERATING AREAS	GENERAL GUIDANCE		
RISK ASSESSMENT	A risk assessment must be in place before crane operation. The risk assessment should consider the following:		
	Operating limits of crane (overhead services)		
	Access/egress to and from location/studio		
	Studio/location hazards		
	 Overall weight limits/load requirements 		
	 Ground conditions/temporary platforms/stability of crane dolly tracks 		
	 Passenger requirements (ie. seat belts) 		
	 Use of remote camera heads instead of passengers where practical 		
	Remote operation		
	Grip and operator/technician experience with correct level of NVQ Certification. See Appendix G		
	Assembly/set-up		
	Time/resource requirements		
ASSEMBLY/ SET-UP	Instruction manual supplied by hirer should accompany the crane. Assembly/set-up instructions should ensure the following:		
	Safe working load		
	Correct assembly sequence		
	Duties of the crane in all operating configurations		
	• Pre-use/in-use tests, examinations and check requirements (refer to <i>Appendix F</i>)		
	Correct handling of heavy parts		
	Stability of crane during assembly		
	Correct base dimensions and levelling of crane		
	Recommended counter weight system		
	Security of suspended crane items		
	 Isolation and security of crane when not in use 		
	Correct electrical installation		
	Correct guarding/signing of hazardous parts/movements		
	Consult manufacturer/hirer regarding configurations that are not explicitly specified in the instruction manual (i.e. working on a floating platform).		



CRANE TECHNICIAN GUIDANCE

OPERATION

A crane technician must be able to demonstrate competence in the use of crane equipment Listed below are the key duties that should be undertaken by a crane operator before, during and after use:

- · Crane technician must be a minimum of 21 years of age
- Must not operate crane equipment under the influence of alcohol or drugs. (This can also include some types of medication).
- Check crane before use and report any defects that cannot be dealt with. DO NOT OPERATE AN UNSAFE CRANE.
- Assemble crane strictly to manufacturer's instructions; this should be checked prior to use.
- The crane must be level and correctly balanced. (Temporary platforms and track must be capable of supporting the crane in all operating configurations).
- Weights must be secured as per the manufactures guidelines
- Cameras on remote heads should have a steel safety bond / cable attached securely from camera to head.
- Ensure safe operating area of crane is sufficiently protected to prevent damage or harm to third parties. (Special consideration must be given to avoid overhead structures/electrical services. barriers should be established 6 meters from the overhead electric line(s) to prevent contact.)
- Ensure safe operating area is maintained during crane operation (grip and technician responsibility).
- Passengers when stepping on or off the crane must be under the strict control of the grip (passengers must be made aware that uncontrolled movement off the crane can cause rapid elevation of arm).
- Safety belts must be used when carrying passengers.
- Do not operate a crane in extreme wind conditions (*Appendix C* refers) or where there is a chance of being struck by lighting.
- Properly maintain the crane and safety equipment at all time in line with manufacturer's instructions. (Consider also environmental conditions).
- De-weight the crane and secure when not in use and left unattended.
- Always re-check the crane equipment when being re-used after being left unattended to ensure no damage has occurred.
- When dismantling cranes, weights should be de-weighted before persons or camera heads are removed.



APPENDIX F:

CONTENTS

1. SCOPE

2. INTRODUCTION

3. ORDER REQUIREMENTS

4. QUALIFICATIONS

5. RECORDS

6. ACCEPTANCE STANDARDS

1. SCOPE

This appendix provides guidance for the periodic inspection and testing of camera cranes to ensure continued integrity and safety.

2. INTRODUCTION

The varying designs of camera cranes preclude detailed specification of the tests required for every crane. The manufacturer is aware of where the crane is likely to be subject to fatigue or deterioration and the properties of the materials used. The manufacturer's recommendations regarding inspection for each component of the crane should be followed.

These guidelines describe tests that can be applied in order to meet the manufacturer's recommendations.

3. ORDER REQUIREMENTS

When ordering examinations to be carried out, the persons in control of the crane should ensure that the examiner has the following information:

a) Any manufacturer's requirements and specifications

b) Details of any accidents, damage, repairs or alterations carried out on the crane

c) Copies of previous examination results and examination dates

d) Any other relevant information the examiner requires



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EXAMINATION AND TESTING GUIDANCE

4. QUALIFICATIONS

4.1 PERSONNEL QUALIFICATIONS

Personnel carrying out testing be trained and certified for the methods being used at the appropriate level.

4.2 TEST ORGANISATION

Where test organisations are used, the persons in control of the crane should assure themselves of the competence of the organisation.

The following international bodies are approved by their respective governments for the accreditation of test organisations:

Europe				
Austria	AA			
Belgium	BELAC			
Czech Republic	CAI			
Denmark	DANAK			
Finland	FINAS			
France	COFRAC			
Germany	DAkkS			

Ireland	INAB	
Italy	ACCREDIA	
Netherlands	RvA	
Norway	NA	
Portugal	IPAQ	
Spain	ENAC	
Sweden	SWEDAC	
Switzerland	SAS	
UK	UKAS	
Outside Europe		
Australia	NATA	
Hong Kong	HOKLAS	
New Zealand	IANZ	
South Africa	SANAS	



5. RECORDS

5.1 TECHNIQUES

Tests and examinations should be carried out following detailed written instructions. These instructions should be prepared in accordance with an appropriate national or international standard procedure where these are available. Where such standards are not available, a competent independent authority should approve the instructions. The instructions should include specification of the parameters that require recording at the time of examination. The instructions should be available for scrutiny by an enforcing officer upon request.

5.2 TEST PARAMETERS

If the parameters are not unambiguously defined in the written instructions or as the appropriate standard requires, all the parameters affecting the test or examination shall be recorded. These records should accompany the examination report.

5.3 FREQUENCY

This guidance document recommends the six monthly minimum examination of all modular cranes and 12 monthly minimum examinations of all remote head & telescopic cranes by a competent person/accredited company. Additional testing/examinations should be detailed within a written scheme of work or the frequencies detailed within Lifting Operations and Lifting Equipment Regulations 1998 should be observed.





5.4 RESULTS

The results of any examinations or tests should be presented in a report, which should include:

- *a)* The organisation carrying out the test/examination
- b) The report identity and issue status
- c) The type of crane examined
- d) The principal construction materials of the crane
- e) The identity of the crane
- f) The types of examinations/tests carried out
- g) The test/examination procedure(s) used
- h) The test/examination instruction(s) used
- *i)* The results of the test/examination(s)
- *j)* The disposition of the crane on account of the acceptance standard
- *k)* The test/examination date(s)
- I) The name and qualification(s) of the person responsible for the test/examination(s)





6. ACCEPTANCE STANDARD

The acceptance standard should be as specified by the designer/manufacturer.

Where no acceptance standard is specified the following conditions should be considered unacceptable:

- a) Any cracks or crack-like flaws
- b) Any damage causing local dents or deformation larger than 1mm
- c) Any visible lack of straightness not an attribute of the design
- d) Any twisting of the camera platform beyond the available corrections or beyond $\pm 5^{\circ}$ relative to the fulcrum of the boom. Where no correction for twist can be made the maximum twist of the camera platform should be $\pm 2^{\circ}$ relative to the fulcrum of the boom



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