

# INDUSTRY-WIDE LABOR-MANAGEMENT SAFETY COMMITTEE

## **SAFETY BULLETIN #41**

### **RECOMMENDED GUIDELINES FOR SAFELY WORKING ON AND AROUND GIMBALS**

These guidelines are intended as recommendations for safely working on and around gimbals.

Gimbals are generally one-of-a-kind, purpose-built devices designed to simulate and control movement, such as airplanes in flight, a ship in a storm, and many other situations. Gimbals are typically used to move cast, crew, and sets through a number of programmed or choreographed motions. Gimbals can range in complexity from small-scale, seesaw-type devices moved by simple leverage to complex, multi-axis powered motion bases controlled via computer. Gimbals should only operate to the level for which they are designed. Design and assembly of gimbals are not covered in this Safety Bulletin.

#### **Responsible Person**

The production shall assign a responsible person for the safe configuration and operation of the gimbal. A responsible person is someone who is capable of identifying existing and predictable hazards in their surroundings or working conditions, and who has the authority to take prompt corrective measures to eliminate them.

The responsible person will have oversight of all gimbal operations, including, but not limited to, the authority to:

- Determine the maximum weight capacity that the gimbal can support and consider when a structural engineer may be needed.
- Identify potential hazards in the gimbal's work area.
- Determine control measures: develop strategies to eliminate or reduce the risks associated with each identified potential hazard.
- Implement control measures, monitor their effectiveness, and adjust as needed.
- Determine the exclusion zone around the gimbal and control areas.
- Determine (in conjunction with the lighting and/or electrical department) if the gimbal structure or its controls, including any electrical equipment used in association with the gimbal, will require a safety device such as a Ground Fault Circuit Interrupter (GFCI). This determination should consider the hazards associated with a loss of power, causing an unexpected shutdown of the gimbal.
- Abort operations.
- Designate an operator(s) as needed.

- Coordinate with other departments to identify fall hazards for cast and crew and appropriate means of protection (e.g., barriers, guard rails, pads, fall restraint equipment, appropriate anchor points).

## Potential Risks

Production Management and the responsible person should be aware of these potential risks and address them in conjunction with the appropriate personnel:

- Environmental and human factors.
- Hydraulic leaks.
- Inclement weather, such as windy conditions.
- Access to the gimbal by cast and crew.
- Placement of electrical equipment and power supply system.

## Exclusion Zone

A clearly defined exclusion zone is the immediate area surrounding a gimbal and should be determined by a responsible person. Authorized cast and crew are allowed to enter the exclusion zone when it is determined to be safe by the responsible person. Some ways to designate the exclusion zones may include caution tape, barricades, signage, light signals, and notification on call sheets.

## Pre-Rig and Construction

The production must ensure that the working surface for the gimbal can sufficiently support the intended load, including camera, personnel, and any other items that may be on the gimbal. Stage floor construction, pits, tanks, and other substructures may impact the load capacity of the gimbal's working surface. Evaluation by a structural engineer may be necessary to determine the load capacity of the gimbal's working surface.

Other considerations during pre-rig and construction include:

- Limitations of the gimbal should be communicated to all applicable departments by the responsible person.
- Re-examine exclusion zone: The exclusion zone may change during construction and pre-rigging. Always communicate these changes to the cast and crew.
- Establish work procedures (e.g., lockout/tagout/blockout, fall protection, safety communications) and other protocols for working on or around the gimbal.
- Establish emergency shutdown procedures: The dynamic action of the gimbal may create an additional hazard to personnel working on or around the gimbal if an immediate shutdown is required. Personnel on or around the gimbal may have to take specific action to protect themselves in the case of an emergency shutdown.
  - Consider safety sensors and emergency stop buttons as they can serve as

immediate measures to quickly terminate the gimbal operation.

- All safety sensors may need to be calibrated and tested before initial use of the gimbal.
- The responsible person should be consulted before operating heavy equipment (e.g., aerial lifts, camera cranes, forklifts) around the gimbal, hydraulic lines, and/or control lines.
- When necessary, crib or block to prevent parts from moving inadvertently when the gimbal is not in operation.
- Ensure crossovers and/or protective covers are used to protect hoses, electrical cables, and control lines, and to prevent possible tripping hazards.

Operation and testing of the gimbal shall be within its structural and engineering limitations.

All items included in this section should be reevaluated throughout the production as conditions change.

### **Inspection and Testing**

Representatives from all applicable departments should be included in conducting inspections of their equipment on or around the gimbal, prior to operation.

Inspections and testing by a responsible person should include:

- Evaluate the limitations of the gimbal, such as, but not limited to, load capacity, how it may be affected by water, weather, additional equipment, structures, dust effects, etc.
- Check all electrical distribution system components exposed to water. These components should be designed to work when wet or submerged.
- Inspect gimbal, base, hoses, structure, and service connections to equipment on the gimbal (e.g., electrical special effects).
- Gimbal controls and movements should be tested prior to any rehearsals or filming with personnel on the gimbal.
- Evaluate potential impact on cast and crew within the intended load and range of movement.
- Prior to operation, verify that the exclusion zone is free of any unauthorized persons or items.
- Where applicable, check for electrical and/or radio and wireless interference and maintain the proper perimeter around the gimbal and computer controls.
- Check attachments to the gimbal to ensure that they are properly secured.

### **Safety Meetings**

The First Assistant Director should, along with the responsible person, conduct a safety meeting

with the applicable cast and crew, including, when necessary, a Stunt Coordinator, prior to working on or around the gimbal.

At the safety meeting, the First Assistant Director should identify the designated responsible person, who may discuss topics, including:

- Exclusion zone parameters, including cast and crew members authorized to enter the exclusion zone.
- Gimbal limitations.
- Work procedures around the gimbal.
- Emergency procedures, including emergency shutdown procedures.
- The full range of movement, need for increased awareness, possible changes, authority to abort, and audio and visual signals.
- The possible effects of electrical, radio, and wireless devices on radio-sensitive equipment.

The responsible person should be notified of any changes or concerns regarding gimbal operations, actions of the cast or crew, or placement of equipment to determine if adjustments are necessary. Additional safety meetings may be necessary.

### **During Operation**

- Follow established procedures when entering the exclusion zone.
- With the permission of the responsible person, secure set pieces, production equipment, and props on the gimbal.
- The gimbal operator should be at the controls at all times when the gimbal is operational, with a clear line of sight, using additional spotters to assist, as needed.
- Keep unauthorized personnel away from controls at all times.
- Watch for loose materials, sharp edges, pinch points, etc.
- Authorized cast and crew should be reminded of the anticipated movement of the gimbal.
- Ensure clear, safe access and egress.
- Maintain reliable communication during operation.
- Always wait for the responsible person's permission before approaching the gimbal.

Additional information may be found in Safety Bulletin #4, Stunts; Safety Bulletin #7, Recommendations for Diving Operations; Safety Bulletin #15, Guidelines for Boating Safety for Film Crews; Safety Bulletin #17, Water Hazards; and Safety Bulletin #23, Guidelines for Working with Portable Power Distribution Systems and Other Electrical Equipment.