

US&R Heavy Equipment & Rigging Specialist Training

Module 2 Unit 1: HERS Site Protocol

May08

National Urban Search & Rescue Response System
Heavy Equipment & Rigging Specialist Training



Heavy Equipment & Rigging Specialist Training



Module 2 Unit 1:
HERS Site Protocol

Mar08

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Unit Objective

- Understand the Duties of the Heavy Equipment and Rigging Specialist (HERS)
- Understand how the HERS can positively interact with the Structures Specialist (StS)

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Enabling Objectives

- Review the Duties of the HERS as listed in the HERS Position Description
- Learn that effective performance of these duties will lead to safer and more efficient operation of heavy equipment at the Rescue Site
 - Use of Forms CU-1, RAP & ICS-214
- Discuss Crane Inspection & Maintenance
 - Use of Form CI-1
- Discuss the need for the HERS and StS to combine their talents for positive results
- Review Common Terms

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Duties of the HERS

- Ensuring the safety of Task Force members by assessing hazards at disaster sites pertaining to the operations of cranes and other heavy equipment, and adhering to all safety procedures
 - Interact w/TFSO & StS
 - I.D. working areas of Equip.
 - ◆ Pinch points, Boom swing radius
 - ◆ Equipment backup zones, Load-out Zones

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Duties of the HERS

- Assess the need for, and capabilities of various types of construction-related equipment to assist task force personnel in US&R activities.
 - Coordinate w/ RTM
 - ◆ I.D. critical, time related rescue needs
 - ◆ I.D. appropriate equipment needs
 - ◆ I.D. appropriate equipment availability, ETA
 - ◆ Alternate Plans
 - ◆ Crane Use Form CU-1

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Crane Use Form

- Use as check-off when ordering crane



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Duties of the HERS

- Assess disaster site for safe and efficient location of cranes and other heavy equipment
 - I.D. Obstructions
 - ◆ Overhead wires, trees, overhangs, etc
 - ◆ Underground Vaults, basements, etc.
 - Access to Site
 - ◆ Bridge & roadway capacity
 - ◆ Permits and Escorts

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Duties of the HERS

- Prepare site for and assist with positioning and setup of cranes and other heavy equipment, including initial safety inspection of all heavy equipment
 - I.D. Equip setup area
 - ◆ Coordinate with RTM/TFL
 - ◆ Understand equipment setup requirements
 - Size of area and support equipment
 - Equipment Safety Inspection
 - ◆ Crane certification
 - ◆ Operating condition of equipment
 - ◆ Man Basket Inspection (Certification & Test)
 - Operator certification/license – see later slide

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Duties of the HERS

- Identify various rigging techniques to assist in the rescue of victims or stabilization of collapsed buildings, including the development of rigging plans and procedures.
 - Coordinate w/ RTM & StS
 - Develop RAP
 - ◆ Applies to Operational Period
 - ◆ Applies to Special Lifts
 - ◆ Use as Hand-off document to next shift

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Rigging Action Plan

- Work-up for each operational period
- Can use as hand-off document



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Duties of the HERS

- Interact with and coordinate efforts between the task force personnel and heavy equipment operators, contractors and organized labor.
 - HERS is liaison between TF & heavy equipment operators
 - ◆ HERS should be the primary contact
 - ◆ Assist operators in dealing with the special conditions of a Rescue or Recovery Site
 - HERS needs to coordinate contractor activities
 - HERS needs to be sensitive to local Organized Labor issues

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Duties of the HERS

- Providing documentation to assist Task Force in procuring cranes and other heavy equipment, as well as maintaining daily logs (ICS 214).
 - 214 needs to include detail of heavy equipment hours of operation
 - May need to deal with equipment Tags
 - ◆ Operated Equipment (Machine + Operator)
 - ◆ Rented Equipment (Machine only)
 - May need to deal with service/repair persons
 - Crane Inspection & Maintenance Form
 - ◆ See later slide

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Module 2 Unit 1: HERS Site Protocol

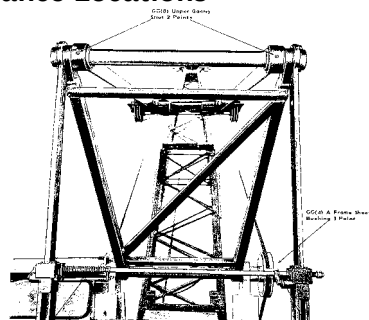
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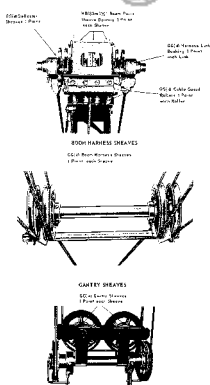
Gantry Struts



GG (100) Garry Sene
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Boom Head



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Role of HERS & Interaction with StS

- HERS and StS need to **INTERACT** efficiently during US&R operations
- Each approaches problem from distinctly different directions

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Role of HERS & Interaction with StS

(continued)

- HERS knowledge mostly based on hands-on experience and some theoretical training
- StS knowledge mostly based on logical study and limited exposure to actual situations
- Ideally they integrate knowledge for a synergistic result

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HERS Knowledge

- Materials and building construction systems
- Small tool operation and maintenance
- Rigging means and methods
- Demolition means and methods
- Construction safety practices
- Sub-contractor coordination and management
- Construction force organization and management

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HERS US&R Focus

- US&R team operations and resources
- How US&R task forces can use construction resources effectively

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StS Knowledge

- Building construction systems and materials
 - Current and historical
- Load paths and failure mechanisms
 - Vertical and lateral
- Shoring, bracing, and other mitigation methods
- Monitoring device installation and use

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StS US&R Focus

- Identifying and reducing risk to US&R team and victims
- US&R team operations and resources
- How building construction affects search operations, success, and rescue operations

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HERS and StS Interaction

- Work together during planning and operational phases
 - Plan debris removal and stability of remaining structure
 - Select most appropriate mitigation methods
 - Assess structural stability during operational phase
- Either may take lead position
 - Working in harmony is ESSENTIAL

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HERS and StS Interaction (continued)

- HERS leads in developing debris removal strategies
 - Selection of most appropriate tools
 - Needs evaluation of on-site resources
 - Needs estimation of timelines
 - Needs evaluation of risks of various options
- StS gives supporting input

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HERS and StS Interaction (continued)

- StS leads in evaluating stability of damaged structure
 - Amount of damage
 - Original design and possible alternate load paths
 - Load capacities and anticipated vertical and lateral loads
 - Mitigation methods that are practical and available
 - Risk during and after mitigation
- HERS gives supporting input

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Harmony is Essential

- HERS and StS agreement may require both to compromise
- Effective communication REQUIRED
- Conflict requires TF leadership to decide
 - May lead to negative perceptions and negative results
- Concurrence communicates positive impression
 - Promotes trust in decisions by entire incident command structure

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See Student Manual for discussion:

- HERS Pre-Deployment Tasks
- HERS Deployment Tasks
- HERS Continuing Tasks

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Common Terms

- Force is given in
 - 1 Kip or 1k = 1,000 (kilo) lbs
 - 1 Ton or 1T = 2,000 lbs = 2k
 - 1 Metric Ton or 1T = 2,200 lbs (2,204.6)
 - 1 Long Ton = 2,240 lbs
- Stress = Force/Area
 - Force per unit area = psi, ksi, psf, tons/sq ft

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Common Terms (continued)

- **Breaking strength = Ultimate Strength**
- **Working Strength = Breaking Strength/Safety Factor**
 - Crosby uses WLL = Ultimate Strength/ Design Factor
- **Safety Factor (SF) for Wire Rope**
 - SF = 5 for lifting applications (6 in Canada)
 - SF = 3 for other general structural uses
 - SF = 10 when lifting people

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Review Enabling Objectives

- **Review the Duties of the HERS as listed in the HERS Position Description**
- **Learn that effective performance of these duties will lead to safer and more efficient operation of heavy equipment at the Rescue Site**
 - Use of Forms CU-1, RAP & ICS-214
- **Discuss Crane Inspection**
 - Use of Form CI-1
- **Discuss the need for the HERS and StS to combine their talents for positive results**
- **Review Common Terms**

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Evaluation

**Please complete the evaluation form for
Module 2 Unit 1: HERS Site Protocol**

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STUDENT MANUAL

HEAVY EQUIPMENT & RIGGING SPECIALIST TRAINING

MODULE 2

UNIT 1: RESCUE SITE PROTOCOL

Unit Objective

After completing this unit, you will understand the role of the Heavy Equipment and Rigging Specialist (HERS)

Enabling Objectives

You will:

- Review the Duties of HERS as listed in the HERS Position Description
- Learn that effective performance of these duties will lead to safer and more efficient operation of heavy equipment at the Rescue Site
 - ◆ Use of Forms CU-1, RAP & ICS-214
- Discuss Crane Inspection & use of Form CI-1
- Discuss the Interaction between HERS and the Structures Specialist (StS)
- Review Common Terms





I. Objectives

Unit Objective

After completing this unit, you will understand the role of the Heavy Equipment and Rigging Specialist (HERS)

Enabling Objectives

- Review the Duties of HERS as listed in the HERS Position Description
- Learn that effective performance of these duties will lead to safer and more efficient operation of heavy equipment at the Rescue Site
- Discuss Crane Inspection & use of Form CI-1
- Review Common Terms

II. Duties of the HERS

Ensuring the safety of Task Force members by assessing hazards at disaster sites pertaining to the operations of cranes and other heavy equipment.

Providing for the Safety of task force members during the operation of heavy equipment is listed first, because it is most important. The HERS must work with the Safety Officer to develop the special safety measures that need to be employed when this useful, but very dangerous equipment is brought to the disaster site.

There are unique safety issues involved, and the HERS must assure that all task force operations will be adjusted in order to minimize risk. These issues include

- Identifying and marking off pinch-points where the crane cab can rotate towards its base, thereby trapping individuals between the two surfaces
- Identifying the danger zones under to boom swing
- Identifying backup and quick turn zones that need to be avoided by rescuers
- Identifying loading zones where truck traffic and loading operations that will need to be cautiously traversed by rescuers

Assess the need for, and capabilities of various construction-related equipment to assist task force personnel in US&R activities.

In coordination with the Rescue Team Manager (RTM), the HERS must assess the need for and type of heavy equipment that will best facilitate rescue operations. This assessment must include the following:

- Identifying the critical time related rescue issues, such as where to most critical, viable victims are located, and what sort of heavy equipment would best aid in their removal.
- Identifying what heavy equipment is readily available, and the time required to obtain more ideal equipment.
- Providing alternate methods for victim access and confining debris removal
- Crane Use Form CU-1 to assist in ordering a crane (next page & Disasterengineer.org)

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US&R Crane Use/Order Form CU-1 By: _____ Date: _____ Page _____ of _____

Situation Name: _____ Rigging Task: _____ Weather Conditions: _____		Date and Time of Lift: _____ Task Force Name: _____ Task Force Leader: _____	
Load Description: Load Weight: _____ Block Weight: _____ Rigging Weight: _____ Jib Weight: _____ Jib Ball Weight: _____ Hoist Line Weight: _____ Other Weight: _____ Total Weight: _____		Crane Operator: _____ Crane Make & Model: _____ Crane Serial No: _____ Boom Length: _____ Jib Length: _____ Jib Position: ☐ Stowed ☐ Retracted ☐ Offset at _____ Size of Counterweights Installed: _____ Front Outrigger Installed: Yes No	
Lift will be On: ☐ On Main Block ☐ On Jib		Setup On: ☐ Crawlers ☐ Outriggers ☐ Tires ☐ Extended ☐ Retracted ☐ Other	
Max. Intended Working Radius Over Rear: _____ Over Side: _____ Over Front: _____	Boom Angle: Over Rear: _____ Over Side: _____ Over Front: _____	Rated Capacity: Over Rear: _____ Over Side: _____ Over Front: _____	Percent of Capacity ; (Total Load / Rated Capacity) Over Rear: _____ Over Side: _____ Over Front: _____
Hazards: ☐ Electrical ☐ Fire ☐ Underground ☐ Other _____			
Are Crane Mats, Blocking Req'd: _____			
SKETCH 			



Assess disaster site for safe and efficient location of cranes and other heavy equipment

Cranes and other moving equipment must be positioned so that they fit within the limits of the rescue site environmental setting. The conditions that will need to be assessed include:

- Location of overhead obstructions such as electric transmission lines, building overhangs, trees, elevated signs, etc.
- Underground vaults, pipes, basements and basement walls, etc. that can be overloaded and/or collapsed by the very high bearing loads imposed by cranes and other heavy equipment

In addition, in order to travel to the site, the heavy equipment may encounter any of the following conditions:

- Limited load capacities and clearances of bridges, overpasses, and other elements of roadways.
- The need to provide escorts and permits in order to transport wide and/or heavy loads.

Prepare site for and assist with positioning and setup of cranes and other heavy equipment, including initial safety inspection of all heavy equipment

The HERS will need to determine detailed information regarding the setup requirements of all incoming heavy equipment, such as:

- Size of the area needed to park the trucks transporting the crane or other equipment
- Size of the area required to assemble the equipment, especially cranes
- Type of additional equipment and personnel that may be needed during equipment assembly, especially crane booms

The HERS will need to carefully coordinate with the RTM, regarding the positioning of the heavy equipment, so it will be most efficiently located to aid the rescue effort. This should include planning for the location of debris removal and unloading/transfer areas. The more that these issues can be addressed, prior to the arrival of the equipment, the more the rescue effort will be facilitated

The HERS needs to assure that the equipment that is to be used is in proper working order. If possible the following should be checked:

- Certification of cranes and other equipment, as well as maintenance logs
- Operating condition of cranes and other equipment, such as:
 - Running and standing wire ropes, including their terminations
 - Is crane equipped with safety equipment such as anti two-block device, load moment indicator (computer), outrigger load spreader pads/blocks, etc
- Does the man basket (s) have a certification tag? Make sure that the crane performs the required test lift of the man basket including its complete route of travel



Identify various rigging techniques to assist in the rescue of victims or stabilization of collapsed buildings, including the development of rigging plans and procedures.

In coordination with the RTM and the Structures Specialist, the HERS should develop methods and as many alternatives as possible to facilitate the rescue effort. The HERS should prepare rigging plans and briefings in order to effectively communicate the intended procedures. For all important and critical lifts, a special pre operation briefing should be conducted.

The following two forms have been developed to assist the HERS:

- The CU-1 form is intended to be used in determining what type and size of crane should be requested for a particular incident, or rescue operation
- The Rigging Action Plan (RAP) form is intended to be used to plan the rigging operations for a given operational period. The same RAP may be used in subsequent operational periods, but in many cases a new and modified RAP would be prepared.
 - The RAP should become a useful, document to hand-off to the HERS that will be working in the subsequent operational period
 - A special RAP may be developed, as needed, for special operations involving heavy equipment
 - See next page for example of RAP Form. See Disasterengineer.org for full forms

Interact with and coordinate efforts between the task force personnel and heavy equipment operators, contractors and organized labor.

Most heavy equipment operators and contractors are not familiar with US&R Operations. They are especially not experienced with operating their equipment near live and recently deceased victims. The HERS should be the primary liaison between these operators and contractors and others working at the disaster site. Some of the important issues are:

- The need for extra care and skill in moving, and removing, heavy objects near victims. Often loads must be lifted carefully, without any undesired rotation.
- Operators need to be prepared for the probably that both live and dead victims will be uncovered and removed
- The moving of heavy objects may need to be carefully coordinated with their being cut free of entanglements.

In most cases, the HERS must maintain overall control of heavy equipment operations. This will require the establishment of a trusted working relationship between the HERS and the operators.

- Operators will need to maintain control of their equipment. The HERS will need to quickly establish cooperative working relationships, in order to maintain a safe and efficient work environment

The strength of labor unions will vary depending on the location of the incident. The HERS needs to be sensitive to local union issues and work rules, and needs to determine if union representatives need to be included in initial briefings. Securing union cooperation is essential, and has not been a problem in past incidents



US&R Rigging Action Plan - RAP Task Force: _____ Date: _____ Op Period _____ Page _____ of _____

LOAD PATH HAZARDS

Chain of Evidence Needs:

SKETCH:



Providing documentation to assist Task Force in procuring cranes and other heavy equipment, as well as maintaining daily logs (ICS 214).

After coordinating with the RTM, the HERS may need to work directly with the Task Force Logistics Team in order to start the process of procuring the services of heavy equipment for the disaster site.

In past incidents, cranes, and other heavy equipment have been brought to the site, almost immediately to aid the local Incident Commander. Following the initial more chaotic phase of the disaster, various types and sizes of heavy equipment may be needed.

- At this point it will be important that the HERS be involved in suggesting specific types and capacities of equipment as well as alternatives

It is important for all US&R Task Force units to keep and file periodic reports.

- All units are required to file an ICS 214 form at the end of each operational period. See next page for example of ICS-214
- One of the most effective and accurate ways to gather the information for the 214 is for the HERS to maintain an hourly log in a pocket notebook.
- Since there are so many tasks to perform, and decisions to record during the initial, hectic hours of an incident, one should not expect that everything will be remembered at the end of a shift.
- Also there needs to be a hand-off of information to the on-coming HERS that needs to be efficiently accomplished

It may be necessary for the HERS to maintain an hourly log of usage for the various pieces of heavy equipment that are operating at the disaster site

- In some cases the equipment companies may have a contractual relationship with the Authority having Jurisdiction at the Incident Command Post.
- In other cases they be working directly for the Federal Disaster Field Office under the Federal Coordinating Official
- In any case, the HERS may need to verify the numbers and types of heavy equipment that were operating during any operational period and how many operators were being deployed
 - Records need to indicate if equipment was provided with or without operators
 - Records also may need to specify if any servicing or repairs were required

Providing accountability, maintenance, and minor repairs for all issued equipment.

This is the requirement of all FEMA Task Force members. It is likely that some of the task force rigging cache will be become damaged during the intense use at an incident.

- The HERS should inspect it daily, and provide for its replacement either during or immediately following the deployment



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UNIT LOG		1. INCIDENT NAME		2. DATE PREPARED	3. TIME PREPARED
		StS2 Training – 20-25May07			
4. UNIT NAME/TEAM DESIGNATION		5. UNIT LEADER (NAME AND POSITION)		6. OPERATIONAL PERIOD	
7. PERSONNEL ROSTER ASSIGNED					
NAME		TEAM POSITION		HOME BASE	
8. ACTIVITY LOG (CONTINUE ON REVERSE)					
TIME	MAJOR EVENTS				



III. CRANE INSPECTION

When a crane is summoned to the disaster site it is important for the HERS to inspect it in a careful and efficient manner. A US&R Crane Inspection Form (see below) has been developed in order to provide an easy check-off procedure. If significant deficiencies are found, they would need to be addressed quickly, or another crane should be sought. Go to Disasterengineer.org, Library for full size copies of all 3 HERS Forms

- Following the initial inspection, each crane should be inspected every day, best at the same time. These daily inspections should be able to be completed quickly, if the initial inspection is done carefully, and all deficiencies are corrected.
 - Crane operations during a US&R Incident may be very intense, so the crane's components must be kept in their best operation condition.
- Outriggers and their supports should be inspected at no greater interval than 12 hours. The pads, cribbing and soil under them will be subjected to great pressure, and the stability of the crane depends on the ability of these elements to firmly resist the loads.
 - Following any significant event such as an aftershock, interval of high winds (over 25 mph), or incident that causes significant vibration to be delivered to the structure, all crane supports should be re-inspected.

Cranes are complicated machines, and inspections are required if they are to perform the critical lifting that is necessary in life saving situations.

US&R Crane Inspection Form CI-1 (Inspecte Every Day) Checked Daily Log on Arrival: YES _____ Date Arrived: _____ Sht _____ of _____

Situation Name: _____			Crane Size & Type: _____			NOTE: *Outrigger Supports - Pads, Cribbing, Soil, etc Under Outriggers Must be Inspected Every 12 hrs and/or After Every Aftershock, etc.						
HERS Name: _____			Crane Supplier: _____									
RTM Name: _____			Operator Name: _____									
Task Force: _____			Oiler/Rigger Name: _____									
ITEMS TO INSPECT	Insp. Date:		Insp. Date:		Insp. Date:		Insp. Date:		Insp. Date:			
Separate sht for each Crane	OK	Repair	Comment	OK	Repair	Comment	OK	Repair	Comment	OK	Repair	Comment
Crane Certification												
Load Chart												
Is Crane setup per Chart												
Load Indicator												
Boom Angle Indicator												
Outriggers												
Outrigger Supports*												
Oil Level												
Radiator Coolant												
Hydraulic Fluids												
Horn												
Mirrors												
Lights												
Tires												
Steering												
Hydro Controls												
Hydro Cylinders												
Electric System												
Swing												
Hoists												
Wire Rope												
Hook & Blocks												
Clutches												
Brakes												
Fire Extinguisher												
Air System (if applicable)												
Other:												
Comments:												



IV. ROLE OF HERS AND INTERACTION WITH STS

Structures Specialists (StS) and HERS need to work together to design effective rigging systems for US&R. Each specialist has something to add to solve a rigging problem at a rescue site.

They bring knowledge of this topic from two distinctly different directions.

Most engineers know little about wire rope and other rigging devices and their uses.

However, their education in engineering gives them the knowledge to easily calculate the effects of the forces easily. Dealing with forces and vectors is part of a normal engineering education.

Most riggers have broad, practical experience with many types of rigging devices and solutions. They know what has worked in the past and is practical. However, their experience in the use of numbers and the relationships of forces at angles is not as great as that of most engineers.

The HERS and the StS share responsibility for bringing a broad knowledge of building construction types and methods to the US&R task forces.

- The knowledge of the HERS is based on hands-on experience and some theoretical training.
- The knowledge of the StS is based on logical study and is conditioned by limited exposure to actual situations.
- Ideally, these two specialists will integrate their knowledge with a synergistic result.
- They both must work synergistically under the RTM

The HERS knowledge base includes the following:

- Building construction systems, materials, and methods;
- Small tool operation and maintenance;
- Rigging means and methods;
- Demolition means and methods;
- Construction safety practices;
- Sub-contractor coordination and management; and
- Construction force organization and management

During US&R operations, the HERS tends to focus on the following:

- US&R team operations and resources and
- How US&R forces can use building construction resources effectively.



The StS knowledge base includes the following:

- Current building construction systems and materials,
- Historic building construction systems and materials,
- Vertical and lateral loads,
- Probable failure mechanisms,
- Bracing and shoring methods, and
- Monitoring device installation and use.

During urban search and rescue, the StS tends to focus on the following:

- Identifying and reducing the risks encountered at the rescue site for the benefit of US&R teams as well as the victims,
- US&R team operations and resources, and
- How building construction affects the success of search and rescue operations.

The HERS and the StS will need to work together during the operational planning process and may continue working together during the operational phase of a deployment.

During the planning process, the debris removal strategy and stability of the remaining structure will be a source of common concern.

During the operational phase, continuing structural capacity and stability concerns will involve both the HERS and StS. The HERS will lead, and the StS will act in a supporting role in development of debris removal strategies involving:

- Selection of appropriate tools,
- Evaluation of on-site resources,
- Estimation of timeline, and
- Evaluation of risks of the various options.

The StS will lead and use input from the HERS in evaluating the stability of the damaged structure, requiring the determination of:

- Amount of damage,
- Design load paths,
- Possible alternate load paths,
- Theoretical load capacities,
- Anticipated loads to be resisted,
- Monitoring methods available, and
- Mitigation measures possible.



During these periods of overlapping responsibility, it is essential that the StS work in harmony with the HERS.

- Agreement may require both specialists to compromise.
 - Conflict between the two specialists will result in the Incident Commander and the other members of the operational command having to decide for themselves whom to believe.
 - Conflict will result in negative perceptions and possible unfortunate results.
- Concurrence between the two specialties will communicate a positive impression.
 - Concurrence will strengthen the trust placed in their joint decisions by the entire task force structure.
 - The performance of the task force will be enhanced by this positive relationship.

HERS Pre-Deployment Tasks

As an effective member of the task force, the HERS needs to develop resource lists of local and statewide specialty contracting firms, such as crane companies and demolition contractors. This work should be coordinated with other task forces and the FEMA rescue working group.

Sources for this information may be found in:

- Phone books: local and 800;
- The *Bluebook of Building Construction* and their website www.thebluebook.com;
- Trade unions, Local Utility companies, and other websites (AGC, NADC);
- AGC, National Association of Demolition Contractors; and

Field reference books, including the *StS FOG*, published by the U.S. Army Corps of Engineers, Training and Resource Ctr (www.tirc.net), N. American Crane Bureau (www.cranesafe.com), and Crane Safety Ltd. (www.cranesafety.com)

Maintain the rigging cache. The cache should be inventoried and inspected annually, and after each deployment and training use.

Any additional items that are thought to be critical should be forwarded to the FEMA rescue work group for consideration.

StS Pre-Deployment Tasks

The Structures Specialist has similar, pre-deployment tasks to perform, as follows:

- Help the HERS develop the resource lists discussed above.
- Maintain the Structures Specialist cache.
- Provide input to the FEMA technical working group.
- Input can be provided through the Task Force Leaders and through the FEMA Structures Sub-group. See DisasterEngineer.org



HERS Deployment Tasks

There has never been a “typical” US&R incident, so the following are only suggestions based on past incidents.

- It is relatively easy to outline the procedures that should be followed in a single structure incident. No structure triage is required, and search and recon can be ongoing activities throughout the incident. All task force activities can be focused on one disaster site.
- In large disasters in which many buildings could be assigned to each task force, structure triage may need to be performed in order to prioritize the initial deployment of the Search and Recon Team. The assessment, planning, and implementation tasks might be repeated several times, as the task force moved from one structure to another.
- In any case, most of the following tasks should be, at least, considered for each damaged or collapsed structure.

Before the initial task force deployment briefing:

- Discuss the situation with the StS and Rescue Leadership before arrival at the site to share information and discuss probable needs, alternatives, and solutions.
- Immediately upon arrival, determine whether an Incident Support Team (IST) is in place and is able to provide a briefing.

During the initial task force deployment briefing:

- Understand the disaster situation and the scope of the task force’s objectives;
- Make sure that the communication plan and safety signaling system are understood;
- Review the process for supply requests (through the IST, local command, or other); and
- Be prepared to present and discuss possible uses of heavy equipment and local contractors.

Develop an equipment and tools needs list:

- Coordinate all needs with the IST, if appropriate.
- Acquire or develop a list of qualified, local contractors.
- Determine the needed size and type of equipment and possible alternatives.
- Establish staging and setup areas, especially if large cranes are involved.
- Determine what travel routes are most appropriate and whether police escorts are possible for large pieces of mobile equipment.
- Assistance could be available from police, the fire department, and media services, including news helicopters.
- Estimate the time required to setup heavy equipment.



HERS Continuing Tasks

Once the 12-hour shift schedule is established for long-term, single-structure incidents, briefings will normally occur at every shift change. In other cases, briefings will occur as needed.

The HERS will need to attend all appropriate briefings and/or meetings, or he or she will need to pre-brief the appropriate leader who will present the HERS information.

- Depending on individual task force structure, the HERS may be working under the Rescue Team Manager or the Technical Team Manager.
- In any case, it will be very important that the HERS continue to coordinate and cooperate with rescue, StS, and the IST operations (Structures Specialist).

The HERS should continue to keep the contractor's construction personnel informed on the disaster situation and objectives. This should be done at least every 12 hours.

V. COMMON TERMS

There are engineering terms that we will now review

- A Force may be given in the following:
 - Pounds or lbs
 - Kips or k, 1k = 1,000 (kilo) lbs
 - Tons or T, 1T = 2,000 lbs = 2k
 - Metric Tons or T, 1T = 2200 lbs (actually 2,204.6)
 - 1 Long Ton = 2,240 lbs
- A Stress is a Force per unit area, given as follows:
 - Pounds per square inch = psi
 - Pounds per square foot = psf
 - Kips per square inch = ksi
 - Tons per square foot = tons/sq ft
- Breaking Strength of a Wire Rope = Ultimate Strength
- A Stress is a Force per unit area, given as follows:
 - Pounds per square inch = psi
- Safety Factor (SF) for Wire Rope (Crosby uses Design Factor)
 - SF = 5 for lifting applications (6 in Canada)
 - SF = 3 for other general structural uses
 - SF = 10 when lifting people



VI. SUMMARY

The HERS duties require the use of his expertise and familiarity with the operation of heavy equipment, and how best to efficiently integrate it into the US&R Operation.

- The HERS needs to anticipate the time and space requirements for unloading and set-up of cranes, as well as other equipment.
- The crane operators may or may not arrive with extra personnel to assist with set-up, so the HERS needs to be ready to organize and provide assistance.
- The HERS needs to effectively interact with the heavy equipment operators. Most of them will need to be informed and counseled regarding the special needs of working with live rescue, and dealing with deceased victims
- The HERS needs to be proficient in rigging practices, and be ready to develop Rigging Action Plans (RAP), and provide accountability for all heavy equipment operations.
- The HERS will need to develop an efficient interaction with the Rescue Team Manager as well as the Structures Specialist.
- The HERS needs to keep very accurate records of all activities that are performed by heavy equipment, in order to help account for the time spent and costs associated with their use

Situation Name: _____**Rigging Task:** _____**Weather Conditions:** _____**Date and Time of Lift:** _____**Task Force Name:** _____**Task Force Leader:** _____**Load Description:** _____

Load Weight: _____

Block Weight: _____

Rigging Weight: _____

Jib Weight: _____

Jib Ball Weight: _____

Hoist Line Weight: _____

Other Weight: _____

Total Weight: _____

Crane Operator: _____

Crane Make & Model: _____

Crane Serial No: _____

Boom Length: _____

Jib Length: _____

Jib Position:

☐ Stowed☐ Retracted☐ Offset at _____

Size of Counterweights Installed: _____

Front Outrigger Installed:

Yes

No

Setup On:☐ Crawlers☐ Outriggers☐ Tires☐ Extended☐ Retracted☐ Other**Lift will be On:**☐ On Main Block☐ On Jib**Max. Intended Working Radius**

Over Rear: _____

Over Side: _____

Over Front: _____

Boom Angle:

Over Rear: _____

Over Side: _____

Over Front: _____

Rated Capacity:

Over Rear: _____

Over Side: _____

Over Front: _____

Percent of Capacity :

(Total Load / Rated Capacity)

Over Rear: _____

Over Side: _____

Over Front: _____

Hazards:☐ Electrical☐ Fire☐ Underground☐ Other _____

Are Crane Mats, Blocking Req'd: _____

SKETCH

SKETCH:

A large grid of dots for sketching, consisting of 20 rows and 40 columns of small dots.

Situation Name: _____				Crane Size & Type: _____						NOTE: *Outrigger Supports - Pads, Cribbing, Soil, etc Under Outriggers Must be Inspected Every 12 hrs and/or After Every Aftershock, etc.						
HERS Name: _____				Crane Supplier: _____												
RTM Name: _____				Operator Name: _____												
Task Force: _____				Oiler/Rigger Name: _____												
ITEMS TO INSPECT		Insp. Date:			Insp. Date:			Insp. Date:			Insp. Date:			Insp. Date:		
Separate sht for each Crane		OK	Repair	Comment	OK	Repair	Comment	OK	Repair	Comment	OK	Repair	Comment	OK	Repair	Comment
Crane Certification																
Load Chart																
Is Crane setup per Chart																
Load Indicator																
Boom Angle Indicator																
Outriggers																
Outrigger Supports*																
Oil Level																
Radiator Coolant																
Hydraulic Fluids																
Horn																
Mirrors																
Lights																
Tires																
Steering																
Hydro Controls																
Hydro Cylinders																
Electric System																
Swing																
Hoists																
Wire Rope																
Hook & Blocks																
Clutches																
Brakes																
Fire Extingusher																
Air System (if applicable)																
Other:																
Comments: _____																

FEDERAL EMERGENCY MANAGEMENT AGENCY/U.S. ARMY CORPS of ENGINEERS
National Urban Search and Rescue Response System

[illegible]