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MEDICAL FORCE MULTIPLIER

Applying the Golden Hour Principle to Major Incident Response Resources

The Conscience of EMS JEMS JOURNAL OF EMERGENCY MEDICAL SERVICES

CHARLIE'S HORSE DEPLOYMENT SYSTEM

An exclusive supplement to *JEMS* (*Journal of Emergency Medical Services*)
Sponsored by Charlie's Horse

Table of Contents

CHARLIE'S HORSE®
DEPLOYMENT SYSTEM

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The Conscience of EMS JEMS JOURNAL OF EMERGENCY MEDICAL SERVICES

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A Modern-Day Trojan Horse

By A.J. Heightman, MPA, EMT-P

During the mythological Trojan War, neither the Greeks nor the Trojans seemed capable of winning. The Greeks won many important battles, but couldn't breach the walls of Troy. One day, after a major battle, Odysseus of Ithaca, one of the Greek kings, came up with an idea that some of his followers initially thought impossible. He wanted his soldiers to build a large, hollowed out, wooden horse big enough to conceal and transport a group of Greek soldiers. Then he wanted the horse mounted on wheels so it could become part of a carefully crafted plan to rapidly deploy resources into the city of Troy, an area thought to be out of their reach.

We all know what happened next: Under cover of darkness, the Trojan horse was wheeled into position outside the gates of Troy; a lone Greek soldier convinced the Trojans to bring the horse into their city, and the Greek soldiers inside the horse surprised their enemies and killed the Trojan guards. A huge battle ensued, after which the Greeks claimed victory thanks to their Trojan horse, a large, specialized resource strategically positioned and poised for action at a moment's notice.

This supplement to the *Journal of Emergency Medical Services* (*JEMS)* will introduce you to the innovative Charlie's Horse® Deployment System and the MERF® (Medical Emergency Response Facility), a medical response system that, similar to the Trojan horse, delivers crucial resources to areas where they're critically needed, deploys those resources rapidly in any location and does so by design using a minimal workforce. In addition, many components of the MERF can be used at special and heavily populated events to provide high-quality medical care to those in need.

The Charlie's Horse Deployment System, a series of transfer and deployment canisters, carts, litter platforms and adaptable accessories, in combination with the MERF concept, corrects outdated or inadequate equipment and response doctrines used in the past and truly meets the out-of-hospital needs of today's military and disaster situations.

The MERF is a multi-functional, advanced capability system, a much refined version of the famous M*A*S*H system deployed during the Korean War. Each MERF is designed as a rapid-movement, rapid-set-up, 10-bed facility that comes complete with all the equipment needed to staff an operating room, ICU and triage/treatment/ holding facility.

The MERF's new approach (protocol) to equipment and personnel deployment involves the use of specially designed cargo canisters and multi-functional, low-friction transfer devices that can be easily moved by one person and utilized in multiple ways once unloaded at an incident.

Most importantly, the MERF represents a unique and powerful partnership between Charlie's Horse and 10 of the nation's most respected medical and disaster-response manufacturers. Working together, this group provides a system that allows end-users to bring state-of-the-art medical, trauma and critical-care capabilities to any size incident in a short time period. What's more, they can have all necessary equipment set up and operational within one hour. ■

Genesis of the Charlie's Horse Deployment System & the MERF

The idea behind both the Charlie's Horse Deployment System and the MERF (Medical Emergency Response Facility) was born out of several years of careful research and interviews conducted with members of emergency response agencies, the disaster response community and the Armed Forces medical commands. The interviews determined whether existing protocols for prolonged incidents provided the necessary response and capabilities needed to fulfill mission requirements. The groups were also asked whether existing equipment stockpiles sufficiently supported the personnel expected to implement the response protocols.

What was discovered during the interview process was that there was a gap between those responsible for implementing response and treatment protocols and those who conceived the protocols. It was also apparent that existing equipment was inadequate and required significant manpower to deploy and make operational.

Redundancies also existed in both the military and the civilian sectors. Instead of developing systems and protocols that were synergistic, with commonality of equipment, egos prevailed and funds were squandered.

It became apparent that a new approach was needed when it came to medical equipment deployment and the utilization of manpower in field medical operations at major incidents, particularly those that must be sustained for days—or weeks.

When Hurricane Katrina struck New Orleans and forced thousands of residents to seek shelter in the Superdome, vital resources, such as water purification, oxygen generation and emergency dental services, weren't available for days until disaster medical assistance teams (DMAT) and other federal assets arrived. Considering the size and scope of today's major incidents, be they natural or manmade, this is an "old school" approach to disaster response. Regions must be better prepared to address incident needs early on.

When the Northridge earthquakes struck Southern California in January 1994, they disrupted hospital and emergency department operations, forcing staff members to work in parking lots under the hot sun until DMAT teams and military resources arrived or other shelter facilities were located.

A University of Delaware Research Center report on issues involving intergovernmental coordination during the Northridge earthquakes highlights the need for improvements in the way we respond to and manage large disasters. Some of the issues noted in the study include:

- Governmental lack of coordination—Past research on emergency response has demonstrated time and time again that the major problems between governmental jurisdictions occur from a lack of coordination and communication, often caused by a lack of prior planning.
- Lack of city/county organization—Again, we see evidence of this lack of coordination both within a city and between cities and the county.
- Perceived inability to respond—In the Northridge aftermath, the lack of coordination appears to be related primarily to city officials' perceptions of the county's inability to fulfill its needs on a timely basis. The reasons for these perceptions are many, including logistical incapacity (the inability to get resources to the requesting jurisdiction quickly); lack of a consistent contact in the county emergency operations center; and inquiries concerning resource needs to other governmental entities (e.g., sister cities or the disaster field office).

The solution: Design an integrated deployment system made up of interchangeable parts that can be configured into different pieces of equipment as mission requirements change. This equipment must be reliable, multi-purpose & have a force-multiplying aspect.

These areas highlight the need for a flexible but coordinated disaster response protocol. All field medical operations have a great deal in common, whether they're military combat operations or disaster response operations. The size and scope of instant-demand patient needs are the same in the first few hours after a major incident as they are after a military battle. It has been demonstrated that a more significant clinical impact can be realized—and more lives saved—if triage, surgery and critical care are offered soon after the incident or battle. Where field medical operations differ is in the *types of injuries and illnesses* that are treated in each.

The central issues surrounding all field operations that came to light during the MERF research and interview process included:

- *Concern about the weight and space required to*

deploy the equipment and resources. It's often more effective and beneficial to the community in need to station medical resources in a park or lot so people can access them when roadways are impassable and the transportation system is disrupted, rather than setting up a massive medical tent city in a football stadium miles from the disaster epicenter that people can't access easily;

- *The need for easy deployment of all equipment and shelters*. Resources that are labor-intensive to load and transport equate to delays in medical care. Fast, compact, efficient canisters that can be moved by one person on arrival are time-savers and force multipliers, enabling few to do the work of many;
- *The reliability of the equipment deployed*. Scene managers must be assured that the equipment being delivered to them and used by their medical staff will operate immediately and for sustained periods without failure or the need for maintenance;
- *The need for less dependency on logistical support, particularly because resources required to off-load and move heavy equipment are not always readily available*. If transportation modes are disrupted and industries are shut down after a major incident, so too will be the ability to travel and obtain forklifts and carts to lift and move heavy pallets and cargo containers. Small, easy-to-transfer cargo canisters have been found to be more effective during disaster operations;
- *The need to use available manpower in a more efficient manner*. There are seldom enough human resources available to meet all medical, search-and-rescue, evacuation and relocation demands. Therefore, the manpower assigned to the arrival zone to off-load medical supplies, erect shelters, assemble litters and litter platforms, and set up medical delivery components must be maximized (force multiplication) and able to assist in assembly with limited instruction or direction; and, most importantly,
- *The need to standardize equipment between civilian emergency/disaster response organizations and corresponding branches of the military*. Equipment purchased for deployment at incidents involving the military should be designed and constructed to be compatible with the myriad of equipment the military and other civilian forces will be utilizing. For example, it's essential for patient platforms to not only be compatible with all NATO-approved litters, but also to hold and lock the litters securely in place.

These central issues presented an interesting paradox. How do you *increase* the productivity and capabilities of the individuals deployed to a protracted incident but *decrease* the footprint left by deployable resources?

The solution: Design an integrated deployment system made up of interchangeable parts that can be configured into different pieces of equipment as mission requirements change. This equipment must be reliable, multi-purpose and have a force-multiplying aspect.

Further review of the research and interviews also revealed the need for an improved protocol for field medical deployments, one that could be implemented in all scenarios *with the resources available at the time*. This protocol would also have to address why existing major incident protocols were failing. ■

PHOTO COURTESY RAY BIAS/ACADIAN AMBULANCE SERVICE

During Hurricane Katrina, MERFs could have offered drinking water, oxygen, electricity and advanced treatment capabilities within one hour of arriving at the Superdome.

Why Existing Protocols Have Failed

Existing protocols for major incident response deployment and operations are inadequate. It's assumed that the individuals responsible for implementing these protocols will function at the same levels they function at during training. Such personnel usually train after getting eight hours of sleep and a good breakfast, so their performance level is at its highest.

However, during a disaster, it's not uncommon for deployed personnel to arrive on scene after having little or no sleep for 24 hours. They may also experience a high level of stress if worried about the welfare of loved ones left behind. The performance of these individuals is therefore compromised, and the situation going forward will deteriorate since sleep deprivation and stress only compound as the length of deployment increases.

To add to the stress level on scene, assumptions made about the resources that will be available to assist in scene set-up are often inaccurate, as are assumptions about the condition of the region's infrastructure where the major incident has taken place.

During disasters, such as earthquakes, hurricanes, tornadoes and terrorist events, the existing health-care infrastructure is either overwhelmed or destroyed, and the need for outside help is immediate. Within 72 hours following a disaster, local health-care resources begin to recover and become operational, and the flow of walk-in/drive-in patients begins to subside.

Traditionally, it has taken 72, 96 or 120 hours for substantial medical resources to arrive and become capable of patient care. Disaster management officials must therefore improve their capabilities not only for hurricanes and earthquakes, but also terrorist attacks, tsunamis, floods, pandemic influenza, loss of a hospital due to an incident and large public gatherings, such as state fairs, the Olympic games or political conventions.

The traditional health-care response that provides large, multi-bed resources to major disasters from outside agencies and national stockpiles, which are essential after an incident, is often described as slow and cumbersome. This description does not reflect in any way on the health-care professionals involved, but on the nature of the tools with which they respond.

Deployments with large shelter facilities that take days to deploy and many hours to erect impede the process and delay the care and services desperately needed soon after a major event.

Equipment that takes several hours to set up also delays the readiness of the deployed facility. To add insult to injury, teams arriving to set up operations are often left to fend for themselves.

Two factors that greatly affect the amount of time needed to set up deployments are the weight and bulk of much of the traditionally deployed equipment, which requires significant physical effort to move and position. This results in personnel becoming physically exhausted, stressed and diverted from delivering medical care to those in need. Their exhaustion is compounded by the very nature of the events they're deployed to, putting them under added undue stress.

Deployments with large shelter facilities that take days to deploy & many hours to erect impede the process & delay the care & services desperately needed soon after a major event. Equipment that takes several hours to set up also delays the readiness of the deployed facility.

The usual response teams, such as DMAT, can provide assessment, triage, minor surgery and the equivalent of sick-call care, but they don't have the equipment or capability to perform major surgery or ICU patient management.

Traditional response teams are able to provide potable water and electricity, but they're limited in their ability to supply purified water, medical-grade oxygen, radiology and early emergency dental capabilities. The Charlie's Horse Deployment System and the MERF correct all of these problems and issues. ■

Taking Deployment to the Next Level

Charlie Darling, president and CEO of North Coast Outfitters Ltd., began designing the Charlie's Horse Deployment System in 1996, long before the terrorist attacks of 9/11. After serving as a consultant to the Marine Corps Systems Command on the development of their Forward Resuscitative Surgical System (FRSS), Darling believed high-quality medical care should be readily available to areas desperate for those services after a major incident.


Charlie Darling

The ideal deployment response should be able to:

- Be operationally independent for at least 72 hours or more.
- Deploy by any available means, such as roads that remain traversable by four-wheel-drive pick-up trucks or military vehicles, available aircraft, including rotorcraft, or boats;
- Deploy worldwide within 24 hours and become virtually operational within one hour of hitting the ground by whatever means delivered using any available space;
- Depend entirely on manpower rather than heavy equipment, such as forklifts, to move components and make them operational. A single responder should be able to move up to 750 lbs. of equipment;
- Fit the needs of the emergency, becoming capable of treating dozens to hundreds of patients;
- Deliver basic, optimal patient management from triage through staged resuscitative surgical management; and
- Deploy and become operational so easily that monthly or quarterly training doesn't become overly burdensome for involved agencies and their personnel.

Darling was also concerned with the fact that manufacturers were making and selling products without a complete understanding of the need. He designed his systems from the ground up to include multi-functional carts, stretcher platforms and cargo containers that make deploying a massive amount of equipment simple and seemingly effortless.

The mission statement of North Coast Outfitters Ltd. clearly presents the company's goal: *"Provide the highest-quality equipment to those dedicated individuals who risk their lives protecting our freedom and assuring our safety."*

Darling believes that every customer must have their needs understood and met. He is also committed to seeing that his clients spend their funds effectively.

"I want my clients to buy what they need. They should tailor their response to meet the specific needs of their community in order to make a true impact and save lives," Darling says. Because of this philosophy, North Coast Outfitters Ltd. doesn't utilize dealers or distributors to sell the Charlie's Horse Deployment System or the MERF; instead the company itself ensures each system is individually designed and delivered to meet each customer's specific needs."We do not sell products to our customers; we provide solutions to meet their needs," Darling says. "Our equipment is our sales force."

It is this philosophy that caused Darling to bring together an outstanding group of like-minded companies to form the MERF team. The 10 partners that provided the necessary equipment used in the MERF are all highly respected and successful companies that helped make one man's vision a reality. The partners include:

- **Aseptico Inc.**
- **Carleton Life Support**
- **Global Hydration Treatment Systems Inc.**
- **Impact Instrumentation Inc.**
- **Mid-Atlantic Telerad Inc.**
- **North Coast Outfitters Ltd.**
- **Oceanic Medical Products Inc.**
- **SeQual Technologies Inc.**
- **SonoSite Inc.**
- **Welch Allyn Inc.**

This partnership has made the Charlie's Horse Deployment System and the MERF the most technologically advanced and easily transported mobile medical-care facility in the world. This cohesive team illustrates what can be achieved by like-minded individuals and corporations working together toward a common goal.

For more information on each of these partners, see p. 22. ■

The Medical Emergency Response Facility (MERF) Protocol

Having solved the equipment-deployment and force-multiplication aspects of the paradox, Darling authored the Medical Emergency Response Facility (MERF) protocol. This protocol is a highly functional disaster management and major incident response concept designed to maximize results with the resources available at the time they're needed, with reasonable expectations of success.

How does this concept compare to the traditional disaster deployment? Let's look at a representation of today's typical response to a major disaster.

Large deployed health care facilities (HCF), although effective once they become operational, routinely don't arrive at the disaster region in the first critical 72 hours after an incident (see Figure 1).

In addition, in a worst-case scenario, should a chemical, biological, radiological or nuclear event (CBRNE) occur that contaminates this HCF, 100% of the deployed health-care support offered by the facility will be rendered useless (see Figure 2).

In contrast to the large, single HCF used by many federal agencies and regions, the use of multiple, locally housed, rapidly deployed, scalable, highly mobile MERFs offers multiple advantages and back-up capabilities. This is the primary focus of the MERF protocol.

The MERF protocol for deployment involves multiple, rapidly deployed, scalable, highly mobile MERF systems. As illustrated in Figure 3, the deployment of multiple MERFs, distributed strategically throughout an affected community(s), enables first responders to offer medical and critical services just one hour after an incident occurs.

FIGURE 1

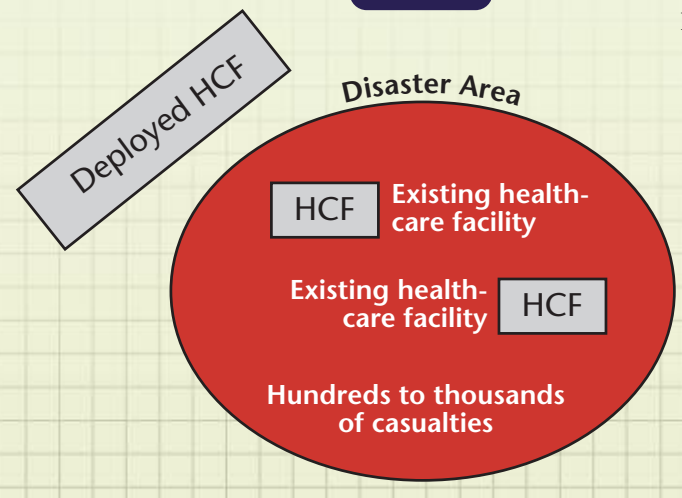
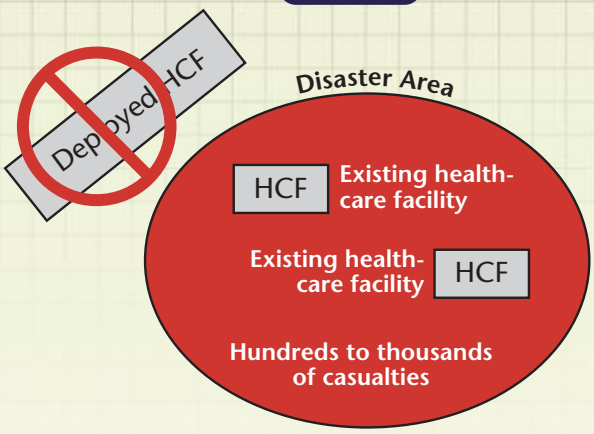


FIGURE 2



Each of the 10 or more of these 10-bed facilities can become operational in less than one hour when an available building or other location is used and in three hours if shelters are required. The facilities offer medical assessments, BLS/ALS treatment, surgery, radiology and ICU capabilities on scene. This means that MERFs will arrive earlier—well within the critical 72-hour window—than federal DMAT teams, hospital ships and other large medical-response resources.

Each of the MERFs is independent, but linked via common communication frequencies or WAN/LAN. Some MERFs can be customized or physically connected together if scene needs dictate. In addition, regions that have existing shelters and mass-care equipment can add components of the MERF, as well as Charlie's Horse canisters, patient platforms and transfer carts, to their existing system.

The versatility of this system allows parts of the facility normally deployed as a radiology branch or ICU area, for example, to easily be converted into an additional treatment or surgical area using the same Charlie's Horse beds/platforms that came with the MERF. The Charlie's Horse transport and litter platforms are all designed to be

adaptable and compatible with the other specialty-area equipment and equipment used by the military. For example, the Charlie's Horse litter platform is compatible with NATO spec litters/stretchers.

In contrast to the earlier example of a CBRNE incursion occurring at an incident due to a secondary explosion and wiping out a single, large-footprint, portable medical facility, because of the relatively small footprint of each MERF and the purposeful distribution of several MERFs, a CBRNE event in the area of a MERF facility will result in only a 10% loss of health-care delivery due to the stand-alone and semi-isolated nature of each 10-bed facility (see Figure 4).

As a situation stabilizes and other large facilities are erected, if the deployed MERFs are still required, they can consolidate into large bed-count facilities (see Figure 5).

In addition, if long-term health care is needed at the scene of a disaster, or should indigenous health-care facilities be rendered inoperable as occurred after the flooding of New Orleans, the larger facilities and consolidated MERFs can remain and function as 100-bed or larger facilities providing continuous surgery, radiology, ICU and post-operative or general medical capabilities. ■

FIGURE 3

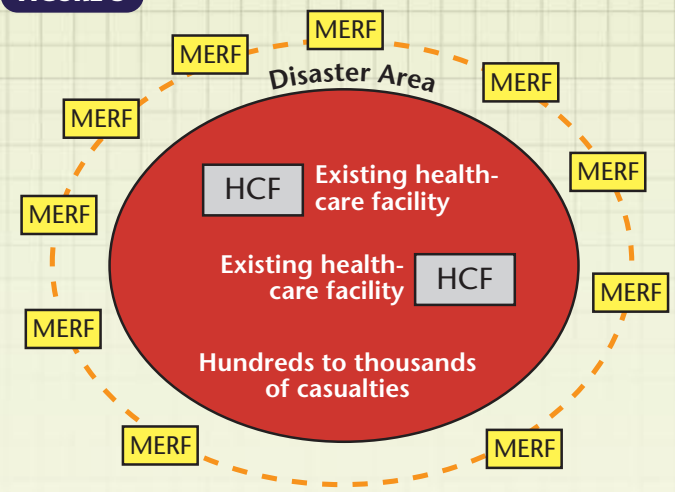


FIGURE 4

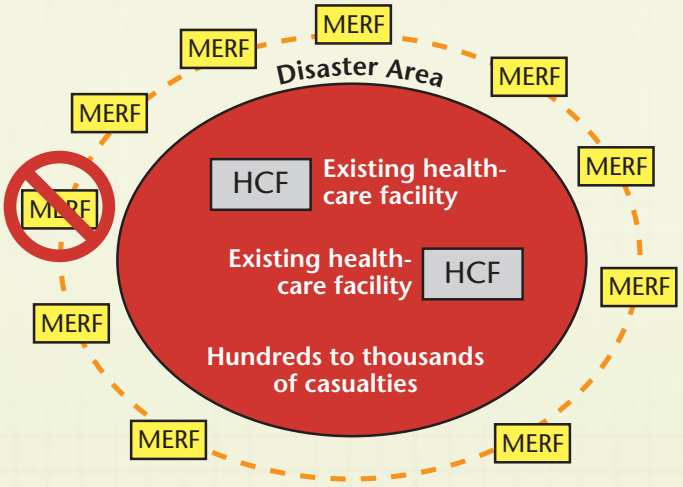
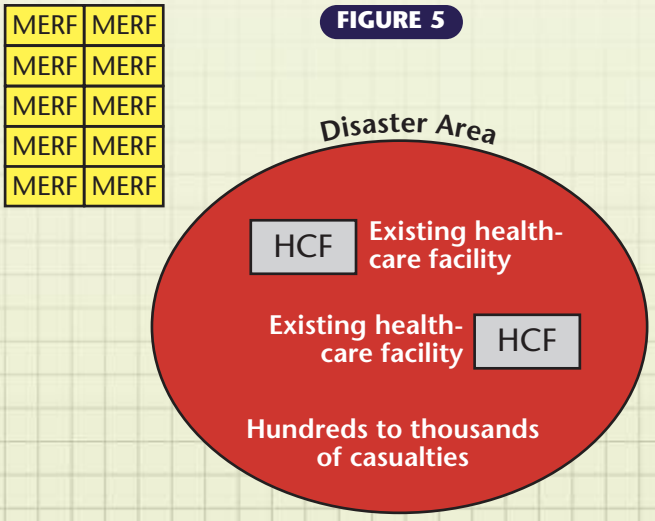


FIGURE 5



In contrast to the large, single health-care facility used by many federal agencies & regions, the use of multiple, locally housed, rapidly deployed, scalable, highly mobile MERFs offers multiple advantages & back-up capabilities.

The MERF Infrastructure

What follows is a detailed description of the Charlie's Horse Deployment System, a typical MERF deployment and the sophisticated equipment and components from industry-leading manufacturers that were selected to be deployment and operational partners in MERF.

Important: This supplement offers just a brief description of the MERF capabilities. The MERF partners also offer myriad additional products and services. Individuals and/or groups that have questions about the equipment referenced in this supplement or need additional solutions to their major-incident or critical-care equipment needs are encouraged to contact Charlie's Horse or the individual MERF partners for more information about their products.

The Charlie's Horse Deployment System

All the factors referenced thus far were analyzed prior to Darling's development of his revolutionary deployment and field operations concepts. Although some manufacturers claim to sell comprehensive emergency response systems for disasters and other major incidents, most are nothing more than tractor trailers, trucks, trailers or tents loaded with cots and miscellaneous supplies not designed for rapid deployment in hard-to-reach areas. They are not highly versatile "systems" like the MERF, and the equipment deployed with them isn't comparable to the multi-function litter platforms, transfer devices, equipment canisters and accessories developed by Charlie's Horse.

The Charlie's Horse Deployment System is very different from any other system available. Unique in concept, design and functionality, every item manufactured for the Charlie's Horse Deployment System is designed from its inception to be part of a truly integrated system intended to serve as a "force multiplier™" and productivity enhancer.

The uniqueness of this equipment is further illustrated by the six patents issued to date (6,142,671; 6,164671; 6,270,092; 6,561,539; 7,017,939; 7,150,465), with 12 more pending.

According to Darling, each item is designed to be "Mission Adaptable, Not Mission Specific™." Each component is versatile, durable and interchangeable. For example, if an agency deploys a MERF and finds that an incident calls for additional surgical or intensive-care capabilities, existing litter platforms can be reconfigured and turned into a fully functional operating table or ICU bed. And all of the Charlie's Horse SR accessories are compatible with each platform rail so they can be transferred to another patient area as needed.

The highly specialized Charlie's Horse Deployment System is an accelerated and advanced outgrowth of equipment originally developed by North Coast Outfitters Ltd. for hunters and other outdoorsmen.

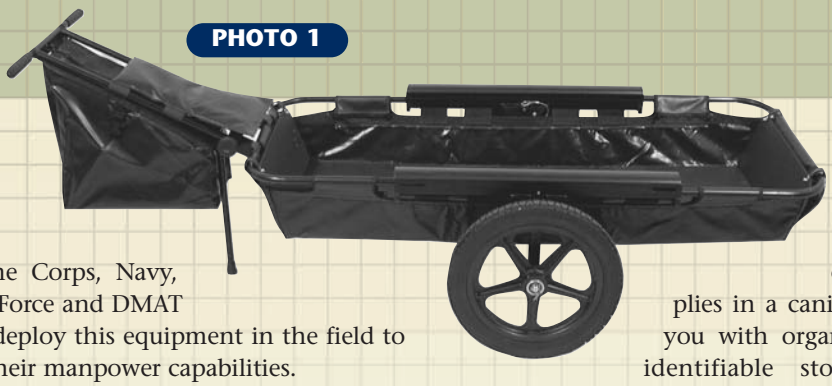
The Charlie's Horse Deployment System consists of three equipment series integrated to provide one overall, inter-related system unequaled in its ability to deploy personnel and equipment to the field and assist in casualty extraction and patient movement/treatment within field medical facilities. For example, with this system, patients don't have to be moved from their litter onto a transfer gurney to be taken to surgery, X-ray or an ICU position. Their litter is simply unlocked from its platform and moved, or the entire wheeled platform can be moved to facilitate the transfer.

Although some manufacturers claim to sell comprehensive emergency response systems for disasters & other major incidents, most are nothing more than tractor trailers, trucks, trailers or tents loaded with cots & miscellaneous supplies not designed for rapid deployment in hard-to-reach areas.

Charlie's Horse Deployment System Equipment Series

1) **SR SERIES:** This series offers seven models of collapsible wheeled stretcher carriers and multi-purpose utility tables that enhance the treatment and movement of patients, as well as assist in the deployment and re-supply of medical facilities.

PHOTO 1



The Marine Corps, Navy, Army, Air Force and DMAT currently deploy this equipment in the field to enhance their manpower capabilities.

2) **CH SERIES:** This series offers four models of collapsible carts that enhance mission capabilities by multiplying existing manpower, expanding the operational range of personnel deploying equipment and assisting in the evacuation of casualties. Military and civilian customers use equipment from this series for myriad tasks to deploy oxygen-generating systems, generators, water purification systems, field medical, X-ray and dental facilities, electronic command posts and ordinance.
3) **CH 661 SERIES:** This series consists of patented fiberglass composite canisters, which offer an enhanced alternative to existing containerization doctrine. A versatile combination of lids, storage containers, trays and sliding drawers can be configured in various combinations and customized to meet specific customer needs, to provide flexibility for payloads and to deploy necessary equipment and supplies in a safe, organized, easy-to-move manner as shown throughout this supplement. The unique design of these durable but lightweight canisters allows you to adapt to equipment and supply needs as they evolve without needing to use multiple containers. An optional set of drawers and trays (used in all MERF packages) fits into the Charlie's Horse canister and allows you to concentrate supplies in a canister and provide you with organized and easily identifiable storage locations. Used in conjunction with the CH 661 (transfer device) series, and the four-wheeled model CH401M4, one person can deploy 750 lbs. of supplies and equipment.

The Marines adopted use of the Charlie's Horse low-profile, two-wheeled, multi-purpose, collapsible cart (the CH101M255) to transport supplies and equipment into a region, and then convert the cart to a platform that can easily transport injured soldiers over rough terrain with minimal effort (see Photo 1).

Special wheels had to be designed that would not fail over rough terrain. The Charlie's Horse wheel is fiberglass-reinforced nylon that incorporates dual 440 stainless-steel ball bearings. The tire used is micro-cellular urethane, which provides all of the benefits of a pneumatic tire without the down side of going flat when needed most. Designed to minimize friction at the hub level and absorb and dissipate shock energy, these wheels allow one person to effortlessly move an injured patient and heavy gear without any assistance. This successful, force-multiplying product used by the Marines led Darling to expand his cargo and deployment expertise into the disaster and emergency medical services arenas.

PHOTO 2

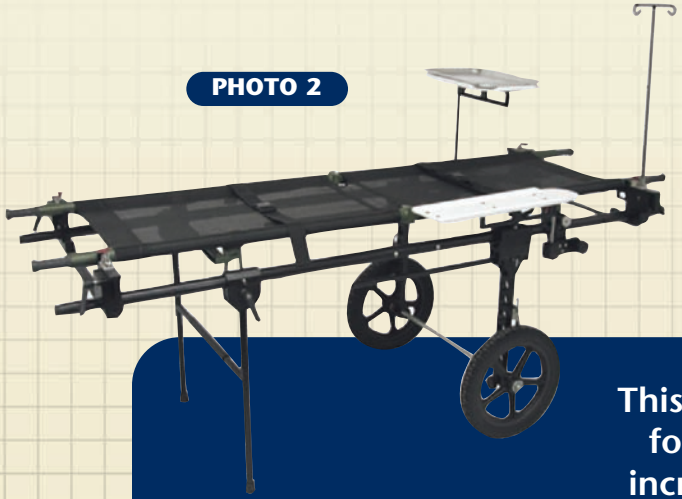


PHOTO 3

This multi-functional equipment reduces the footprint of a medical deployment while increasing the effectiveness of personnel & the quality of medical care being rendered.

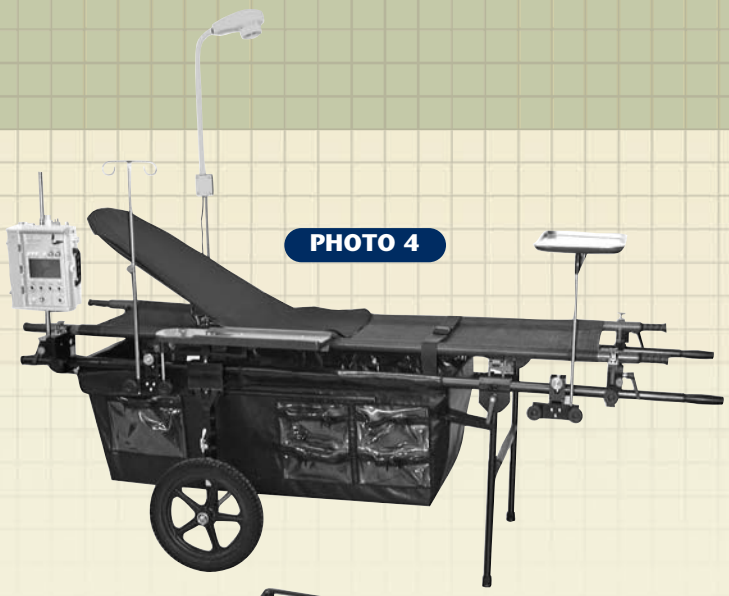


PHOTO 4

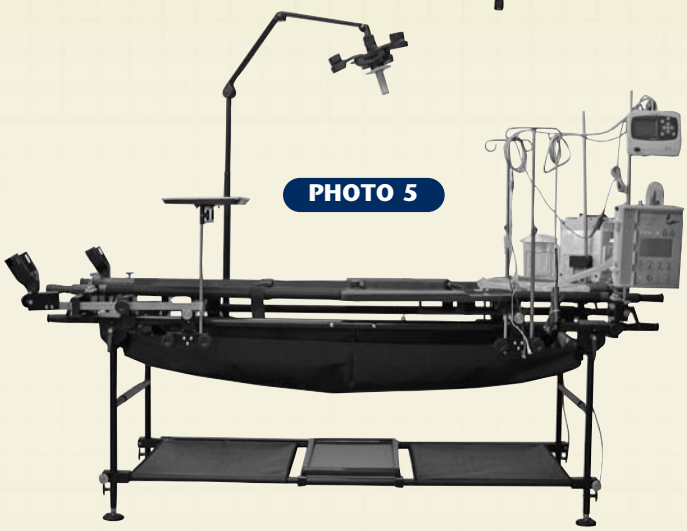


PHOTO 5

PHOTO 6

The wheeled litter stand (SR701RT), developed as a result of the research and interview process, is a perfect example of what sets the Charlie's Horse Deployment System and its equipment apart from all other systems. The SR701RT can function as a basic wheeled litter stand to gather and move casualties (Photos 2 and 3) and can accomodate ventilators, IV poles and other accessories when necessary (Photo 4).

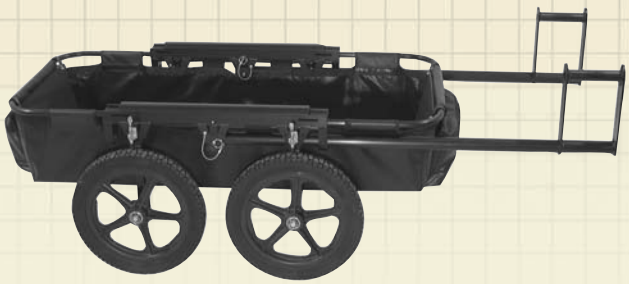
Because of the flexibility built into the Charlie's Horse platforms, the equipment and accessories used on the wheeled SR701 models can be rapidly transferred over to the fixed-base SR901RT multipurpose utility table that can serve as a treatment platform, an ICU bed or operating room platform as mission requirements dictate (see Photo 5).

Therefore, this one piece of equipment reduces the footprint of a medical deployment while increasing the effectiveness of personnel and the quality of medical care being rendered.

A close examination of the SR701RT reveals its unique and important nuances. In addition to providing a stable platform and featuring Trendelenberg and other capabilities, the SR701RT's support structure was designed to absorb and dissipate shock energy encountered when moving injured individuals over rough terrain during evacuation, an important consideration for traumatized victims with painful fractures (see Photo 6).

Through use of the unique equipment developed by Charlie's Horse, all the MERF equipment can be deployed worldwide, *by any means available,* within 24 hours & can become fully operational within one hour of the system touching the ground.

PHOTO 7



Similarly, the CH 661 series can be rapidly transformed into a cargo hauler during initial deployment, enabling a single individual to move 500 lbs. of equipment (see Photo 7).

Charlie's Horse designed a special series of fiberglass containers (see Photo 8) to stack on top of each other within the CH401M4 Cargo Hauler. And, once the equipment containers are off-loaded, each cargo hauler can be transformed into a litter mover or casualty extraction device, if/when necessary.

The Charlie's Horse Deployment System equipment is specifically designed to allow you to maximize the use of limited personnel early in an incident—illustrating the concept of *force multiplication*.

Thus the entire series of multi-functional Charlie's Horse products is designed to store, protect, move and adapt to each incident before, during and after the deployment of the highly specialized product offered by the MERF.

More importantly, through use of the unique equipment developed by Charlie's Horse, all the MERF equipment can be deployed worldwide, *by any means available,* within 24 hours and can become fully operational within one hour of the system touching the ground.

PHOTO 8

CHARLIE'S HORSE®
DEPLOYMENT SYSTEM

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Medical Emergency Response Facility (MERF) Deployment

A step-by-step example of a MERF deployment is outlined below. This will help you better understand the MERF and the adaptability of the Charlie's Horse equipment, which serves as the framework and superstructure in and on which most of the MERF equipment is stored, moved, positioned and used during a mission. *Note:* MERF has been designed to become operational within one hour of arrival within any room of opportunity. Therefore, a shelter is not included as part of MERF; it is optional. A shelter was utilized for this demonstration.

PHOTO 1

PHOTO COURTESY WELCH ALLYN

PHOTO 2

Phase 1 – Equipment & Shelter Off-Loading

As referenced earlier, the MERF storage and deployment containers provided by Charlie's Horse are designed to be transportable by ground, air or sea. Each fiberglass container is made with cargo hooks and handles to facilitate movement and hoisting.

This sample deployment involved the use of the MERF demonstration trailer. MERF's primary means of deployment is two 26', trailers manufactured by Charlie's Horse. These trailers have the capability of transporting all the major components of the MERF to a scene and provide sleeping, facilities for 10 people (see Photo 1).

The MERF trailers are equipped with a winch and rear doors that double as a ramp to facilitate the rapid off-loading of MERF cargo, which is already on wheeled cargo assemblies (see Photo 2).

PHOTO 3


PHOTO 4


PHOTO 5

The CH401M4 cart can be outfitted with four or eight wheels and extendable handles that facilitate movement of the MERF cargo containers and modules loaded with up to 750 lbs. of cargo (see Photo 3).

Staff places a ground cover on the footprint where the shelter is to be positioned, and two additional staff members off-load the heavy shelter with ease via a special Charlie's Horse cart (see Photo 4).

The primary shelter, which weighs 730 lbs. and normally requires a six-person deployment, has been reduced to a two-person effort by the use of the eight-wheel Charlie's Horse bulk hauler (CH401M4BH; see Photo 5).

The primary shelter in which the critical-care facility will be located is erected by a team of four to six personnel. This shelter is lifted into position by an air bladder that raises it with little assistance from personnel. The shelter frame is designed to easily move and lock into position (see Photos 6–8).


PHOTO 6


PHOTO 7


PHOTO 8

The interior bladder is inflated by a small, portable blower to raise the shelter.

PHOTO 9

PHOTO 10

PHOTO 11

PHOTO 12

Personnel erect smaller secondary shelters where treatment, X-ray, surgery and dental facilities will be located (see Photos 9–12).

Personnel then easily connect the secondary shelters to the primary shelter and secure environmental flaps designed to control the climate inside the shelter (see Photo 13).

While the shelters are erected, the wheeled MERF component containers are removed from the trailer with the assistance of a winch (see Photo 14).

Once outside the trailer, staff place smaller equipment containers on top of the larger containers to maximize cargo movement and reduce the manpower needed to move the MERF cargo to the shelters (see Photo 15).

If manpower is limited during the off-loading process, one person can use a hoist to lift and move the smaller containers from a multi-container cargo transfer cart. Special cargo hooks on each corner of the containers facilitate this process. The containers can either be placed on top of a larger supply module or on a wheeled cart and moved to the shelters by one person (see Photos 16 and 17).

PHOTO 13

PHOTO 14

PHOTO 15

Once outside the trailer, staff places smaller equipment containers on top of the larger containers to maximize cargo movement & reduce the manpower needed to move the MERF cargo to the shelters.

PHOTO 16

PHOTO 17

PHOTO 18

Phase 2 – Equipment Staging

Multiple modules (such as supply, critical-care, stretcher, dental, surgery, oxygen and X-ray) are moved into position in front of the large shelter and staged for move-in and set-up in each shelter branch (see Photo 18).

Inside the shelter, personnel simultaneously install wiring and fluorescent lights through existing loops in the ceiling and walls of each shelter. Carabiners can be used to rapidly secure the wiring and lights to the loops (see Photo 19).

Phase 3 – Move In

Personnel move the equipment into their designated primary or secondary shelter space. Signs posted over doorways and connecting tunnel entrances help staff and visitors locate each area (see Photo 20).

Personnel begin to set up their equipment and prepare to receive patients. The easy-to-assemble platforms for each stretcher, operating table or X-ray station can be erected in minutes. (see Photos 21–25).

The five supply modules serve as stand-alone, multi-drawer supply cabinets when positioned on their ends. Each drawer locks into position and, whether in the "in" or "out" position, the clear polycarbonate drawer lids facilitate easy identification of stored supplies (see Photos 26–28).

PHOTO 19

PHOTO 20


PHOTO 21


PHOTO 22


PHOTO 23


PHOTO 24


PHOTO 25


PHOTO 26


PHOTO 27


PHOTO 28

PHOTO 29

When adjustable legs are added to the lid of each supply module, the lid can function as a table or desk for treatment or administrative functions (see Photo 29).

The free-standing Charlie's Horse (SR701RT) stretcher stands serve as a platform for patient movement and can be easily accessorized with a backrest, IV poles, arm boards, instrument (Mayo) trays, lights, Impact ventilator holders and extra storage underneath the platform (see Photo 30).

The Charlie's Horse multi-purpose utility table (SR901RT) can be used as a fully functioning operating table with the same accessories as shown in Photo 30, plus extra


PHOTO 30


PHOTO 33

holders for suction and cardiac/respiratory monitors, as well as a fluid-collection platform suspended underneath and lined with a special absorbent liner (see Photos 31 and 32).

When the MERF shelters are fully equipped and operational, each specialty area operates efficiently together, because they are connected by interlocking shelter components. This includes assessment and treatment areas, surgery, X-ray, respiratory, ICU and dental areas (see Photos 33–35).

DEPLOYMENT SYSTEM

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