

**Logistics, Maintenance & Transportation:  
The Hidden Keys to Success in  
Oil Spill Response**

A Presentation by:

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Murphy's 1<sup>st</sup> Law states: "If anything can go wrong, it will..... and usually at the most inopportune time".

Other common clichés state: "But for the want of a nail in a horseshoe the battle was lost!" and "The devil is in the details".

All emphasize the importance of maintenance, logistics and planning when waging a campaign requiring the movement of large numbers of personnel and equipment, in a compressed time frame.

This is true no matter what the mobilization effort, whether it be a military battle, responding to natural disasters, or oil spills. Operators, planners and politicians may develop and define elaborate tactics and strategies but the logisticians will be the key to success of the mobilization effort. Which is exactly the reason why it is essential for response organizations to preplan their logistic requirements, maintenance and transportation. Along with logistical planning there are several other important fundamental factors, safety and quality assurance, that must be addressed in order to ensure success. First and foremost is safety.

**SAFETY**

Safety is the responsibility of all personnel. An organization's safety objectives are in the best interest of the employee and the company. To prevent accidents and protect company personnel and materiel from loss, safety awareness and prudent safety practices require a comprehensive safety plan along with a team effort, with full personnel participation. Supervisors must be responsible for enforcing all applicable company policies and procedures, which include local, state and federal regulations.

The following is a brief summary of MSRC goals that can be adapted to any organization to reduce the risk of accidents and incidents before they occur:

- ❖ Maintain on-going safety programs to identify employee health and safety risks.
- ❖ Conduct continuous safety training to ensure employees understand their responsibilities and to create increased safety awareness.
- ❖ Eliminate unacceptable hazards and reduce employee exposures in all aspects of company operations.
- ❖ Take proactive positions to provide appropriate guidance where no controlling laws or regulations exist.

In order to accomplish these goals, MSRC incorporates the following:

- Systematic Policies, Procedures and Practices
- Systems for Hazard Identification, Evaluation, and Control
- Management Commitment to, and Employee Involvement in the Safety Program
- Environmental Safety and Health Training
- Documentation
- Evaluation and Feedback

The foundation of safety awareness is the ability to communicate hazards to field operations. Fundamental concerns in dealing with Logistics Maintenance and Transportation include:

- The safety of all logistics and maintenance personnel, both in-house and contractor, involved with equipment load outs and heavy equipment operation. This is accomplished by conducting proper training on all heavy equipment, and by complying with company policy, and state and federal regulations.
- The ability to communicate safety hazards to personnel. This is accomplished by conducting proper safety briefs with in-house and contractor personnel prior to each shift. These safety briefs, and integral part of MSRC's safety program, allow supervisors to communicate concerns to all parties involved. Documentation is produced from these meetings to comply with MSRC protocol.
- The ability to communicate with truckers en-route to a response site. This is accomplished by either cellular phone direct communications or through established contingency plans by communication to the trucker by radio via the trucking company. Other contingency plans

call for the trucker to call in when reaching certain locations for further instructions or directions etc.

- The ability to communicate internally. This is accomplished by using our internal radio system, accompanied by the use of a Communications Suite when necessary. Of course, if available, terrestrial “landline” phones are also regularly utilized.
- Emergency plans for equipment load outs, and for vehicle accidents. This is accomplished by following the MSRC Safety Manuals protocol for local facility emergency plans and accident reporting.
- Shipping and receiving, loading and unloading. Personnel are trained in proper loading/unloading procedures. These techniques enable personnel to load out large-scale pieces of equipment, and transport them safely in enclosed or flatbed trailers. Concerns are paramount when receiving equipment and supplies from outside vendors when shipment may be prepared and packaged in an unorthodox manner. Personnel recognize this aspect and are prepared to handle each situation accordingly.

An entire chapter of MSRC's Safety Manual is dedicated to the safe and efficient use of vehicles. MSRC minimizes injury to employees and damage to company assets by applicable safe operating procedures, and by complying with state and federal Department of Transportation regulations.

## **MAINTENANCE**

With a diverse inventory of 16 large Oil Spill Response Vessels, 17 large Oil Spill Response Barges, over 200 smaller barges and boats, vehicles, and spill recovery equipment, a comprehensive and aggressive maintenance program is fundamental to success. The following are key success factors in MSRC's maintenance program:

### **Maintenance philosophy:**

- Proper maintenance not only provides the foundation for oil spill response, but also protects our significant and valuable capital investment in ship, barges, and equipment
- Maintenance is an integral part of daily operations
- All personnel are involved with maintenance management or performance
- Preventative and corrective maintenance is tracked, reported and audited
  - ❖ Tracking and documentation of maintenance action items are an integral parts of MSRC's Quality Assurance program
  - ❖ You “inspect what you expect” of your organization

- A single maintenance management system is used for all spill response vessels, barges, boats, vehicles and equipment
- Maintenance costs are minimized through innovation
  - ❖ Vessels, barges and equipment were designed to minimize on going, down stream maintenance costs
  - ❖ Use of new technology & techniques – trend analysis, new materials, failure analysis
- Central management of maintenance requirements, and
- Compensation incentives for superior maintenance performance
  - ❖ All employees are held accountable for maintenance success (or failure!)

**Automated maintenance System:**

Key to success in the management of any preventive & corrective maintenance program is availability to system. In light of this requirement, MSRC has developed and uses a system programmed to meet our unique requirements, and operate on an existing company wide network called MSRC Operating System (“MOS”).

- MOS computer program contains the inventory of all equipment to be maintained, maintenance requirements and frequency
- MOS provides weekly/monthly schedules, and logs maintenance and repair history by each individual piece of equipment
- Monthly reports are generated and reviewed by all levels of management contain:
  - ❖ Completed preventative maintenance
  - ❖ Deferred/not completed preventative maintenance
  - ❖ Pending corrective maintenance

## **What is maintained? How is it maintained?**

Given the geographic diversity of MSRC's area of operations, and the relative lack of use of some spill response resources (due, fortunately, to the relative lack of oil spills), equipment is generally maintained with a focus on planned "long term, low usage".

The following are indicative of how MSRC balances the requirements of a high readiness posture, with fiscal responsibility:

### Oil Spill Response Vessels (manned) and barges (unmanned):

MSRC's fleet was designed to incorporate construction materials and machinery specifications that minimize maintenance costs, such as:

- Inorganic zinc/epoxy exterior coatings
- Epoxy coated voids, bilges, and ballast tanks
- Copper nickel drain and salt water piping
- Stainless steel fasteners topside
- Bolted "sacrificial" zinc anodes that can be changed by divers

### Miscellaneous Spill Assets:

- Polyethylene "shrink wrapped" to preserve exposure to the elements
- Introduction of long term "preservative" lubricating oils into prime movers
  - ❖ Provides the benefit of term preservation, with the ability to operate the resource
- Diesel fuel treatment, to mitigate the growth of algae in standing fuel inventory
- Solar chargers for maintenance of batteries, as appropriate, and
- Periodical & scheduled rotation of spill response assets for training or exercises
  - ❖ "put some hours on the system"

### **Summary of Key Readiness Maintenance Challenges:**

- Long term diesel fuel storage
- Hydraulic hose deterioration on deck and spill equipment
- Electrolysis – not considered by many manufactures given low usage of resources

- Screw pump impellers "freeze up", given low tolerances,
- Rechargeable batteries on portable equipment, and
- Last but not least, continuing to focus on the details.

## **TRANSPORTATION**

### **Over the road transportation:**

Over the road transportation of emergency oil spill response equipment requires detailed contingency planning. The ideal situation would call for all response equipment to be pre-staged on trailers with dedicated trucks and drivers standing by. Unfortunately, due to extended periods between use and maintenance, this ideal situation cannot be fully realized. Typically most spill response contractors have critical equipment pre-staged on trailers and maintain a minimum of vehicles capable of towing the trailers. The vast majority relies on contracted trucking services. As with any contracted service related to emergency response, redundancy is a requisite.

There are many variables that must be considered when dispatching a shipment of spill assets to a marshaling site, including:

- Vehicles (tractor and trailer) must be compatible,
- Equipment must be properly loaded and secured,
- "Wide loads" and low (overhead) height restrictions, and
- Clear direction must be provided to the pick-up area and destination

With many emergency transports, the load might be dispatched before a firm destination is determined. Communications between the driver and the logistics manager is essential. ETA's, enroute directions, and the coordination of deliveries are all critical. Mobile/cell phones have proven to be invaluable. The following are key planning elements in the mobilization of trucks:

- Adverse weather conditions must be recognized and taken into account.
- Identification of the most efficient routes, avoiding heavily populated areas during periods of peak congestion, knowing locations of potential bottlenecks, i.e., tunnels, bridges, toll gates, highway construction, border crossings, etc.
- Knowledge of local traffic laws and regulations is required. Single drivers are limited to the number of hours they may drive. Although different laws and regulation apply in different areas, a rule of thumb is ten hours behind the wheel with an eight-hour rest between shifts.

Two drivers with an on board sleeping accommodations is preferable for long hauls.

- “Wide” loads (those over 8 feet (2.44 meters) width in the United States) should be kept to a minimum. Oversize loads present problems that result in delays, both in actual driving speed and increased surveillance.
- Vehicle documentation must be in order. In the United States this includes both truck and trailer registrations, insurance documentation, proof of inspection, federal Department of Transportation certification, and proof of heavy vehicle fuel tax compliance.
- Preventive maintenance must be accomplished faithfully on all rolling stock. Trucks should be fueled prior to departure. Roadside repair services should be previously identified and contracted.
- At the destination, a staging area should be established. Means of unloading the trailers must be provided; fork trucks, cranes, loading docks, etc. Ample parking space should be provided. As in cases of extended use of response equipment, it is inefficient to have a large number of trucks and drivers “standing-by”, during the response, but it is advisable to keep a minimum on hand for unexpected shifts and deployments.

#### **Air Transportation Arrangements:**

In the event of a response to a geographically remote or logistically distant site, MSRC has developed its Response Equipment Airlift Contingency Transportation (REACT) Package.

Key components of MSRC's REACT include:

- Designed to assist customers in their efforts to mobilize and deploy vessel of opportunity skimming systems (VOSS), boom, and towable storage bladders (TSB) to areas that have experienced a significant spill incident and require additional equipment.
- The standard REACT Package includes (approximately):
  - ❖ Various skimmers with 60,000 bbls of derated effective daily recovery capacity (TEDRC),
  - ❖ 13,000 feet of boom and
  - ❖ 7,000 bbls of temporary storage by way of bladders
  - ❖ a “tactical” communications kit, and
  - ❖ response personnel
- However, REACT can be customized depending upon the specific customer requirements
- REACT was designed to fill out the cubic capacity and weight restrictions of a Boeing 747 aircraft. If 747 aircraft are not available, or the destination airport cannot accommodate this large aircraft, multiple smaller aircraft may be sourced and used.

- In identifying MSRC equipment for the REACT Package, MSRC selected equipment from multiple MSRC locations to reduce the overall local response impact in any single area and to maintain MSRC’s OSRO classification throughout the MSRC Operational Area.

**Air Transportation considerations:**

In general, large commercial aircraft can transport cargo:

- in bulk,
- in air cargo containers, or
- on pallets

Pallet position availability:

Different aircraft have varying load capabilities. Following, is an indication of how many aircraft “cookie sheet” pallets (each measuring 125-inch x 88-inch/317 cm x 223 cm) can be stowed on differing, commercial aircraft:

<u>Aircraft</u>	<u>Number of pallet positions</u>
• 707	13
• DC8-50 series	13
• DC8-62	14
• DC8-63 and 70 series	18
• 747 any series	38
• 727-100	9
• 626-200	12
• L1011	23
• C-130	Bulk only

Worthy of note, different aircraft have varying height limitations for cargo. Although a general rule of thumb is a 96-inch (243-cm) height restriction on aircraft, it is critical to confirm.

### **Preparation for transportation:**

While a detailed discussion on airlift preparations is outside the scope of this paper, generally, the key steps in prepping a load for air transport include:

- **Selection of an Air Services Contractor:**  
A dependable air service contractor is essential to quickly obtain appropriate aircraft for the method of cargo transportation selected. The air services contractor must be able to meet requirement for multiple aircraft if necessary.
- **Weight of equipment:**  
A key planning factor when stowing out aircraft is the weight of the equipment. Although, generally, on most commercial aircraft you will “cube out” before “weighting out”, the aircraft cargo master must have accurate weight data so he can effectively trim out the load plan.
- **Hazardous substances:**  
There are international and local requirements restricting the transport of hazardous substances. It is important to check with your local government aircraft regulator to assure compliance.
- **Aircraft loading:**  
There are cargo forwarders and handlers at most airports to help facilitate loading. Prior to an operational emergency, arrangements should be made with a cargo handler familiar with your requirements. As mentioned above, having cookie sheet pallets nets and straps and weight data available will help expedite loading.
- **Permits and customs:**  
In the event of an international mobilization, transportation of equipment between countries will normally require various permits and customs arrangements. An agent or freight forwarder will normally handle these requirements and it is necessary to investigate local permit and customs requirements beforehand.
- **Airlifting equipment from multiple staging areas:**  
MSRC’s equipment is located at many sites through the United States requiring the identification of multiple staging airports, and mobilization to a marshaling hub airport.
- **Supervisory Personnel:**  
Airlifting supervisory and/or response personnel to accompany the response equipment should be considered.
- **Arrangements at destination airport:**  
Finally, arrangements must be made at the destination airport to offload the response equipment and transport it to the response scene. Your air service contractor should confirm that cargo-offloading equipment is available at the destination airport.

## **TIEING IT ALL TOGETHER:** **THE MSRC QUALITY ASSURANCE PROGRAM**

In order to provide customers with an effective response capability, a Quality Assurance Program is important. MSRC maintains its readiness posture and its emphasis on transportation & logistics through its internal Quality Assurance Program (QAP). The two goals of MSRC's QAP are:

- To assure management of valid state of readiness and response; and the status and condition of equipment and personnel
- To rapidly identify response functions that need improvement and provide a mechanism that will recommend improvements and expedite the implementation of these improvements.

This is accomplished through the effective use of the program's two major components:

- "No-notice" **drills** which are designed to stress the core response functions of the organization.
- "No-notice" or "short notice" **inspections** that are designed to evaluate the status of response resources.

The program is designed to provide a means for challenging the response functions and continuously improving them. Key success factors of MSRC's QA Program include:

- Realistic, yet demanding scenarios are utilized in the Drill component to provide the challenge. Essential to the evaluation of the transportation/logistics function of a response is the choice of locations to effect a simulated spill. Scenario sites are chosen to provide logistical challenges for MSRC's Oil Spill Response Vessels and Oil Spill Response Barges.
- Locations remote from MSRC's many equipment caches are sometimes chosen to evaluate the use of contracted transportation assets (i.e., tractor trailers for shore based equipment transfer, tug boats for barge transportation and air assets for both personnel and equipment mobilization).
- The inspection component of the QAP evaluates the condition and preventive maintenance records of all response equipment, with particular emphasis on transportation assets.

Another feature of the QAP is to provide a reporting mechanism which will ensure any "lesson learned" will be implemented in an efficient and effective manner. This reporting process ensures required improvements are recorded, monitored and implemented in a timely manner.

## **In Summary**

Although personnel are not specifically addressed in this presentation, we all must recognize the “human element” as a key success factor for any oil spill response. Trained personnel provided with proper equipment are essential to overall spill response success.

However, as we have discussed during the presentation, I feel that the hidden keys to success in a spill response are the fundamental concepts of safety, logistics, maintenance, transportation and quality assurance. Let’s use these keys to unlock the door of success and not lose the battle due to the “want of a nail” or derail operational progress because we unexpectedly met “Mr. Murphy” at the height of a spill response.

Thank you for the opportunity to share these thoughts with you.