Time-Critical ORM Scenarios

"Pop quiz, hotshot. There's a bomb on a bus. Once the bus goes 50 miles an hour, the bomb is armed. If it drops below 50, it blows up. What do you do? What do you do?" – Dennis Hopper as Howard Payne in "Speed"

Sure, this was a movie, and sure, it is never going to happen to us, but this scene is an excellent (if extreme) example of time-critical ORM. ORM is useful in almost every situation, and it boils down to two questions. What are the risks? What are you going to do to manage those risks?

We often hear variations of the phrase "bad stuff happens," but it doesn't just happen. We all have some control over our environment and nearly always can prevent bad stuff from happening to us and those around us if we pay attention and think.

Nothing is unusual about the following events—until something breaks the usual pattern. As the events unfold, ask yourself some questions. Who will act first? Will it be the person who has the most experience? The one who first recognizes the emergency or who recalls their immediate-actions training? If everyone involved was using ORM, it would be the right person with the right experience. That doesn't always happen.

Scenario 1:
Weapons Quals
"Hey, that guy's aiming his pistol at me!"

A command is doing weapons-qualification firing. All personnel have attended their familiarization training, and most have qualified before. Ten shooters are on the line. The range safety officer (RSO) provides the expected course of fire and starts the course. "Ready on the right," he calls. "Ready on the left. Ready on the firing line."

Before the RSO commences fire, a shooter fires the weapon into the ground in front of the firing line. Almost instantly, realizing he has jumped the RSO's command, the shooter turns and thoughtlessly points his weapon at the person standing next to him. The RSO must use time-critical ORM to manage this unexpected event. His actions—and those of the other shooters—will determine the outcome.

Important Questions

1. Who realizes that something is wrong—the shooter? The person he's aiming at? The RSO? The line coaches who are observing?

2. If the RSO has a whistle, does he want to use it on the line when he has just briefed the shooters that the course of fire will start when he blows the whistle?

3. Does the RSO have a bullhorn or PA system?

4. Should the RSO draw his own weapon?

5. Have the next shooters on the line done anything to protect themselves?

The RSO quickly must consider what resources he has at his disposal. The RSO, the line coach, the other shooters will also be considering their resources, but everyone should be calling out "Cease fire!"

What Actually Happened

In this case, the RSO has a bullhorn and commands, "Cease fire, cease fire, point all weapons down range!" He repeats it until everyone complies. The line coaches acted on the RSO orders and assisted in making the line safe. The nervous shooter followed the order with the assistance of a line coach.

The RSO quickly *Assessed* the situation, *Balanced* the resources available, *Communicated* to everyone in the group his orders and intentions. He acted (*Do*) on his resources and removed the threat. The RSO followed up the action by *Debriefing* everyone who was qualifying. The incident was recorded in lessons learned and repeated for that unit at subsequent qualification shoots.

Scenario 2:
Shipboard Engineering Casualty
"Uh oh, that's not covered in EOSS!"

A ship is returning to port after a two-week training event. The engineering watch team has been running basic engineering casualty control (BECC) drills for the past week. The ship also has been operating the damage control training team (DCTT) for an expected main-space fire-drill assessment later in the month. The sea-and-anchor detail is stationed. Restricted-maneuvering is set in the engineering plant, and extra watch standers are on station throughout the ship to add "experienced" personnel to the event. The engineering officer of the watch (EOOW), for example, will have the engineer officer available in main control, and the officer of the deck will have the commanding officer on the bridge.

The ship enters the inbound traffic scheme. The throttleman reports, "Main-reduction-gear lube-oil pressure high, out-of-spec." The top-watch moves in to work on this problem, while the EOOW refers to the casualty section in the Engineering Operational Sequencing Systems (EOSS) and checks the required immediate actions (which are supposed to have been memorized). The EOOW quickly realizes that he hasn't been trained on this specific problem. In fact, this situation isn't covered in EOSS.

Although casualties occur in engineering, this problem is unexpected. The EOOW has trained for various casualties during the BECC drills in the previous week. He has practiced immediate actions for each casualty in the EOSS. Nevertheless, he or she now must rely on time-critical ORM. The EOOW's actions—or the actions of others—will determine the outcome.

Important Questions

1.Who else has realized that something is wrong—the EOOW? The lower-level watch (most likely alerted by the top-watch)? The chief engineer? The OOD, because the EOOW can't answer bells?

2.What dynamics will the CO and the engineer officer bring as they interact with their OOD and EOOW?

3.How will the actions of the EOOW and OOD affect the ship's safety?

What Actually Happened

Working in the time-critical mode, the OOD decides to maneuver the ship to a safe location with available propulsion. The EOOW must limit the ship's bell in order not to damage the main reduction gears.

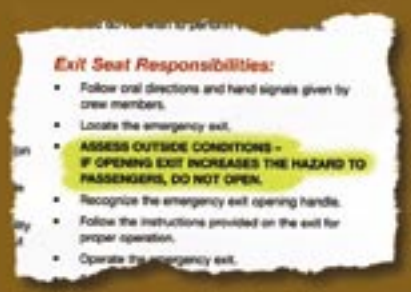
The EOOW quickly *Assesses* his resources: the EOSS, the watch section, the engineer officer, the OOD, the CO. The EOOW is also one of the OOD's and CO's resources. The EOOW *Communicates* the problem and his course of action to the watch section. He alerts the OOD. He requests a 1/3 bell to slow down the condition. He also advises the OOD that propulsion may be lost at any time.

Next he calls upon the engineer officer (his next resource) to brief the situation and get concurrence. The EOOW moves on to the machinist's mate of the watch (MMOW) to determine the cause of the casualty. The MMOW reports that the lower-level watch has taken manual control of the main-reduction-gear lube-oil regulator valve and is maintaining pressure manually. Once the EOOW communicated the problem to the watch section, the lower-level watch got the situation temporarily under control.

Although there is no specific EOSS EOCC procedure for "lube-oil pressure high, out of spec," a good EOOW should refer to his EOCC and review the actions for "loss of lube oil pressure." The most likely cause of this casualty is a faulty or misadjusted lube-oil unloader regulator. The time-critical decision that needs to be made by the EOOW and engineer officer is to place the lube-oil unloader in manual and adjust it. If this isn't done correctly, it could result in loss of lube-oil pressure.

Most importantly, the ship's propulsion was maintained, and the ship navigated to a safe location at an anchorage point until repairs could be made. The EOOW debriefed

Time-Critical ORM in Real Life



Once you start paying attention, you'll notice that society surrounds us with the results of risk-management efforts, ranging from elaborate traffic controls to sprinklers in motel rooms. Here's a great example of a time-critical aspect of the familiar airline-safety card. In spite of general rules and precautions, you still have to maintain situational awareness and make some decisions.

the watch section and recommended that this casualty be installed in EOSS. The engineering casualty training team (ECTT) has installed this as a training item (the ship had been reconfigured from a single set of reduction gears).

Scenario 3:
Shipboard Refueling at Sea (RAS)

A ship is conducting routine pre-deployment exercises in the Cherry Point Op Area with an expeditionary strike group in late January. The expected weather is overcast with a sea state of 2 to 3, with swells up to 8 feet. An LHD is first in line, 1,000 yards astern of the unrep ship. The ship comes alongside and steadies at 13 knots with a 220-foot lateral separation. The distance line is across.

The plan is to take on 350K gallons of DFM at stations one and two, and 85K gallons of JP-5 at station two. The initial hookups proceed as expected on both the DFM rigs and the JP-5 rig. As both ships continue preparations to commence pumping, the sea increases to about a steady state 4, with swells increasing to 10-12 feet.

Both DFM rigs start pumping at minimum pressure. While personnel take initial samples, a wave soaks everyone at station one. All personnel are wearing PPE, and no one is hurt. The first lieutenant arrives on station at station one and assesses the situation. He reports to the bridge that the sea state is increasing, that he sees wave wash and that he has reports of the same at station two. The bridge acknowledges and increases lateral separation to 230 feet. Station two starts pumping at maximum pressure and is receiving fuel normally.

Immediately upon increasing to max pressure at station one, the probe unseats as the ship takes a heavy roll. The hose veers 4-6 feet away from the receiver. The same thing occurs at station two. Main control and the bridge both acknowledge these reports, and riggers try to reseat the probes at both stations. Pumping hasn't yet started at the JP-5 receiver. Riggers reseat both DFM probes, but before they can resume pumping, the probes unseat again.

Important Questions

1. Who else had realized that something was wrong—the OOD? The engineer officer?
2. Should they try to reseat the probes again?
3. Should the ship conduct an emergency breakaway?

What Actually Happened

The first lieutenant contacts the bridge via J-dial. Working in the time-critical mode, the CO, XO, and OOD decided (based on a recommendation from the first lieutenant and consultation with the engineer officer) to stop the unrep and break away. They would then look for a window of opportunity with a better sea state so they could conduct the refueling safely. They based the decision on the facts that the ship was not in danger due to low fuel levels, and they expected weather the following day to be much better.

The XO announces on the 1MC that because the sea state has increased beyond the expected and safe conditions, the ship will conduct an emergency breakaway and coordinate with the oiler to determine a revised RAS time and rendezvous point. The ships breaks away. No one is injured, and less than 15 gallons of DFM has been spilled—

all of it caught in the drip pan.

In terms of time-critical ORM, once the sea state increased, they *Assessed* the worsening situation. The watch section, the first lieutenant, the engineer officer, the OOD, the XO and CO all recognized and *Communicated* the risks associated with this hazard. They changed their course of action. The unrep detail and bridge teams *Debriefed* and agreed this was the best course of action. They also took the opportunity to train their teams to effectively assess and manage risk. The ship refueled 24 hours later without a hitch.

The next time similar events occur, anyone who was caught off-guard (or who didn't know what to do) this time stands a much better chance of being prepared and ready to act. The LHD involved in this event built this exact situation into their ORM briefings.

Scenario 4:
The SAR Mission
"Do you think we ought to launch?"

Several years ago, an East Coast unit sent a detachment out west for a missile exercise. The in-depth ORM applied in preparation for the upcoming detachment was remarkable: a critical analysis of anticipated hazards, along with intensive risk matrices and control measures to minimize risks associated with the upcoming missile exercise.

One day, a crew briefed and completed their deliberate ORM of the missile-exercise mission and was on a weather hold due to a persistent low pressure system in the area. Twelve hours earlier, this same weather system (unbeknown to the mishap crew) had claimed its first victim: a civilian pilot who had crashed into the nearby mountains. As the detachment was preparing to scrub the scheduled exercise due to the bad weather, a query came in from base operations: "Possibility of an overdue aircraft. Are you guys SAR-capable?"

Important Questions

1. Do you launch?
2. Since the crew already had briefed and had ORMed the day's mission (a missile exercise in the low-lands), does that mean they were good to go?
3. If you make the wrong choice, will you survive?

What Actually Happened

The mention of a bona fide SAR to helicopter pilots is analogous to blood in the water to a shark. They get a little excited and tend to broaden the acceptable risk limits. The answer to the query was a strong affirmative. What self-respecting helicopter crew ever would admit that they were not SAR-capable?

They immediately took off into the wild blue yonder. Well, it actually was an overcast, snowing, icing, granite-cloud-filled, unfamiliar gray yonder.

Meanwhile, on the other side of the flight-line, the duty station SAR crew had received the same request. Gathering the facts on the incident, the station SAR crew analyzed the hazards and given facts:

- The private plane had gone down in the high Sierras more than 12 hours earlier.
- The weather was IMC with freezing precipitation forecast for the search area.
- The mountainous terrain included peaks of more than 12,000 feet.
- There was no ELT, and there had been no mayday or call from the pilot.

This experienced SAR crew correctly deduced that this was more likely a search and body-recovery evolution rather than a search and rescue mission. Familiar with the area, they concluded it would be a high-risk mission with a low probability of success. After consulting with the air station CO, they decided to launch but would carefully analyze the hazards that they encountered in flight and make prudent, time-critical ORM decisions along the way.

The CO directed them to terminate the mission when the risk exceeded that which the mission merited. Once airborne and flying into the high Sierras toward the search area, they soon encountered the forecast freezing precipitation and IMC conditions several thousand feet below the intended search elevation. Exercising time-critical ORM and continually *assessing* the flight hazards, they aborted the mission and returned to base.

Once on deck, the SAR crew was challenged with another mission: a SAR for an overdue H-60, same search area. The det aircrew had crashed. There were now two crashed aircraft instead of one, and two of the four aircrew in the H-60 had been killed, all a direct result of the lack of prudent risk decisions.

Analysis of the FLIR videotape from the crashed H-60 showed the crew picking their way through the craggy mountainous terrain and going in and out of IMC. The last 30 seconds of video shows the H-60 entering "presumably" inadvertent IMC conditions followed by a 180-degree right turn into up-sloping mountainous terrain that flashes onto the screen seconds prior to the crash.

In this real-world illustration, all three levels of ORM were practiced. Unfortunately the original, in-depth ORM analysis, once completed, was filed away and left at home, along with the spouses and kids, as the detachment headed west. The time-critical level was done well by the station SAR crew but omitted by the East Coast crew. As is true in most Class A mishaps, the hazards that killed them were the ones they did not anticipate.

Naval aviation is a dynamic environment. How many times has your flight gone exactly as planned? How often have you encountered hazards that you did not perceive when you briefed and ORMed the mission? Your risk analysis is only as timely or as applicable as the last time you did it. ■

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TIME-CRITICAL

Handling the Unexpected

There are unknowns in unexpected conditions. Train people to use the time-critical mnemonic, A-B-C-D: ***Analyze*** the risks, ***Balance*** your resources, ***Communicate*** during the event, ***Do*** and ***Debrief***. Part of the assessment should be contingency planning—what could go wrong and what to do if it does—and a review of emergency procedures. Part of the balancing is making sure all players know what to do and are alert. Part of communicating is what to say (and to whom to say it) when something starts going wrong.

The next time similar events occur, anyone who was caught off-guard (or who didn't know what to do) this time stands a much better chance of being prepared and ready to act.