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Leadership Redundancy in Subsea Operations

Documentation of a Study Utilizing Stimulus
Case Interviews

HSH-rapport 2013/8
Second, revised edition

HØGSKOLEN STORD/HAUGESUND
STORD/HAUGESUND UNIVERSITY COLLEGE

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Abstract

Complex and tightly coupled organizations, despite having clear command lines and rigorous procedures, may be vulnerable to unexpected events that threaten their operations. To succeed, they need the capacity to respond flexibly and swiftly. In subsea operations, it has been proposed that when disruptive events occur while the formal leader is focused on task coordination, others with sufficient time, competence and standing step in and exercise informal leadership. This *leadership redundancy* has been described as a managerial resource that provides critical organizational slack. The present paper describes a methodology to test the leadership redundancy hypothesis and summarizes main findings.

Method: Stimulus cases have been distilled from studies of one subsea vessel that describe a triggering situation (an unexpected event that disturbs the operation, while the formal leader is unable to respond), and an intervention that illustrates informal leadership redundancy (somebody other than the formal leader fulfills a necessary leadership function). 35 informants from the subsea business were interviewed about their reactions to the cases. Their responses were analyzed for 1) the realism of the cases, 2) the realism of the intervention, and 3) the evaluation of the interventions.

Findings: Informants confirmed that the formal leader of the subsea operation must focus his attention on task coordination, and that disruptive events occur that may exceed his capacity to respond. All the triggering situations were confirmed as realistic. Interventions that concern *boundary management* and *problem solving* were confirmed as realistic and appropriate. However, *coaching* performed by somebody other than the formal leader was controversial.

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Foreword

This research forms part of the Complexity Project at the Stord Haugesund University College in Haugesund, Norway. The college and companies in the petromaritime industries in the region are collaborating on this project. The Research Council of Norway has funded 80% and the partners 20%.

The broad question for the project is to understand how companies involved in petromaritime operations handle complexity challenges. The exemplar case covered in the present report is IMR operations: subsea operations that take care of inspection, maintenance and repair of the subsea infrastructure off the coasts of Norway. This working paper documents the methodology and findings from some of our investigations into IMR operations.

The working paper gives more detail than one would expect to find in a journal article, and is intended as a source document for use by our own team and for other researchers who want to go deeper into our methods and findings.

The team is grateful to Associate Professor John Ferkingstad and to Amy Meltzer, Ph.D., for their advice on revising this document.

Foreword to the second, revised edition

In 2015 we published analyses based on the data collection introduced in the first edition of the present report (Johannessen, McArthur and Jonassen 2015). In the process of analysis we had many discussions with colleagues about the methodology and the interpretation of the data. We are particularly indebted to professor Helen Sampson of Seafarer's International Research Centre at Cardiff University, Wales, who pointed out a problem with one of our cases.

Case #2 in the first edition was, like the other cases, based on a real incident, and the interviews triggered interesting reactions from the informants. However, we came to realize that the story did not constitute an unambiguous example of the phenomenon that we had labeled informal leadership redundancy. In Case #2, a shift supervisor gives in to pressure from a client to take on work outside his contractual obligations and outside his expertise. The shift supervisor can be seen as failing to exercise an important leadership function, boundary management. An offshore manager who overhears the conversation intervenes and helps the shift supervisor maintain the appropriate boundary. The difficulty with the example is that the offshore manager is also the formal leader of the shift supervisor. He could therefore be seen as exercising his own leadership functions, rather than stepping in for his subordinate.

For this reason, the case was left out of the analyses that we wrote later. In the present, second edition of our methodological report we have also left out the discussion of case #2, but the text of the stimulus case can still be found in Appendix 1.

Introduction

Theories of high reliability-seeking organizations (HROs) have proposed how certain organizational features, such as the capacity to anticipate and contain surprise (Weick & Sutcliffe, 2007) and to supplement structural rigor with the capacity for flexible response (Faraj & Xiao, 2006) can help explain how some organizations may excel under stress. This theoretical framing alongside our practical opportunities form the background for our choice to study IMR operations:

1. They qualified as high reliability seeking organizations since they have a record for safe and successful operations while facing high complexity challenges.
2. They were accessible to us through our industry partners.

An initial two-week field study on an IMR vessel was conducted in 2009. This helped us get acquainted with the business (Johannessen, 2015 b). We soon got confirmation that IMR operations (like the rest of the Norwegian oil and gas industry) rely on procedures, rules and structures for running the operations safely and effectively. We noticed (Johannessen, McArthur, & Jonassen, 2012; Jonassen, 2012) how a particular operational multi-team system (Mathieu, Marks, & Zaccaro, 2001) springs into action in the intense periods when the operation proper is executed, and how all operational resources are put under the leadership of a shift supervisor.

Inspired by earlier research on HROs (Weick & Sutcliffe, 2007) we hypothesized that this operational organization, alongside its procedural rigor, needed to be able to respond flexibly to the impact of surprise and disturbances. We developed a strategy based on this assumption for analyzing the data from the field trip.

We looked for examples where operational managers were facing tough, non-trivial choices that called for discretion, consultation, and a willingness to act on limited information. These examples, it seemed to us, could be a window into how this particular system operated when it needed to strike a balance between structure and flexibility.

We thought that the most interesting cases might be those that could be construed as dilemmas: situations where several alternatives are possible, each with pros and cons, and where the decision is difficult. This idea provided a heuristic that helped us build our understanding of the data. We sifted through interviews and documented a collection of such situations into a 'dilemma catalogue'¹, and discussed how we could make sense of them. This led us to look more closely at the execution phase of the operations, and at how leadership resources were mobilized and put to use in this phase (Johannessen, McArthur, & Jonassen, 2015). We concluded that:

1. In the execution phase of the operations, authority migrates from the offshore manager to the shift supervisor who is responsible for coordinating and conducting the complex interactions necessary for a successful operation. For the duration of an operation, those involved defer to the shift supervisor's direction, regardless of what company they work for.

¹ The examples were a mix of dilemmas in the strict sense of the word and other challenges.

2. This coordinating shift supervisor tends to stay task focused, having little time left to attend to other leadership functions, such as team relations or coaching.
3. Disturbances do occur that may potentially jeopardize the smooth running of the operation. To deal with the disturbances, leadership functions other than task coordination may be called for.
4. In some cases, when the need arises, others will step in and take care of leadership functions that need attention and that fall under the purview of the shift supervisor.
5. We proposed that leadership redundancy is the availability and use of extra leadership resources to compensate for leadership functions that may otherwise not be taken care of.

We wanted to test more broadly (within the IMR business) if key informants would recognize informal leadership redundancy as a mechanism that might help the organization respond flexibly to needs as they arise, and, to explore the conditions under which that mechanism might work or fail. There were two reasons why we wanted to do a broader study. The field study on which these propositions are based consisted of just one vessel. There was a possibility that the

Table A: Informants by Role and Affiliation

Role	Affiliation	Informants	Informants net
Captain	Shipping company	5	0
Client representative	Oil Company	6	6
Offshore manager	Subsea Contractor	5	4
Project engineer	Subsea Contractor	5	5
Medic*	Subsea Contractor/Shipping Company	6	6
Shift supervisor	Subsea Contractor	8	8
ROV supervisor	Subsea Contractor	5	5
Deck foreman	Subsea Contractor	1	1
SUM		41	35

*) Medics are in most cases subcontracted from a company that specializes in HSE services, but tend to stay with the same vessel for extended periods of time. Hired medics report to the captain in health matters and to the offshore manager in safety matters.

findings were based on peculiarities of one 'local' culture. Also, extant theory (Sagan, 2004) suggested that there might be problems as well as gains from redundancies. For example, initiatives to supplement the shift supervisor during the tightly orchestrated flow of an operation might be seen as a disturbance of the system and not just an advantage. This was not explored in depth in the field study.

For those reasons we devised a method for testing our hypothesis and collected new data from June through December 2011. The present working paper presents:

- Our method; the rationale and procedure for using stimulus cases, how informants were selected, the procedure for conducting and documenting interviews and analysis.
- Our findings; the constraints on the shift supervisor's role and the informants' reaction to three stimulus cases that illustrate three leadership functions (boundary management, coaching and problem solving).

Figure 1: Data Analysis Template

Analysis STI Interview

STI Interview: *File Name*
 Informant: *Informant Category*
 Researcher: *Name of researcher who did the interview*
 Analyst: *Name of researcher who did the analysis*
 Date:

Researchers' Scores

Existence	Description	Check	Evaluation		
			+	-	?
Confirmation	I have seen it				
	I have done it				
	It could have happened				
Disconfirmation	I have not seen it				
	I have not done it				
	It could not have happened				

Comments

Stimulus Case #1

- Confirmation/disconfirmation, and evaluation
Notes
- What is the logic behind the informant's evaluation of the case, including contingencies?
Why: an intervention is necessary
Who: is the appropriate intervensionist
- What does the informant say specifically about the appropriate lines of command in this case and who is the appropriate "owner" of the leadership challenge illustrated?
Notes
- What are the challenges and dilemmas for the role?
Notes
- What are the challenges and dilemmas for the MTS, including balancing flexibility and structure?
Notes
- New themes and additional quotes
Notes

Researcher's notes and selected quotes

The Stimulus Case Method

We applied a stimulus case method for semi-experimental testing (Johannessen & Olsen, 2003) and selected five examples from the dilemma catalog that we saw as examples of informal leadership redundancy and turned them into mini-cases. We knew that the examples had occurred in at least one case, so that they in that respect were realistic. They all illustrated how an “adjacent resource” (most often a leader) would step in and take care of a leadership function that might otherwise have been neglected, and therefore constituted an example of leadership redundancy. All examples were taken from the busy execution phase of an operation; we expected that disturbances in this phase might be the most difficult to handle, and might trigger leadership redundancy.

We sought help from insiders in the business (in individual conversations and in a seminar) to make sure that the cases were realistic and clear, and to remove ‘noise’, such as misunderstandings of jargon that would take the readers’ attention away from the message. A collection of cases was rewritten in a shorter format, so that a reader might react to four within a time frame of 30 minutes (see Appendix 1). After the first test run on a vessel in June 2011, one of the short cases (Case #4) was replaced (as it turned out not to be a clear example of a distinct leadership function), and some minor improvements were made on the others.

The scenarios all follow the same logic:

- A problematic triggering situation that can cause a disturbance to the operation is described.
- Addressing the problem means executing a leadership function (in our cases, boundary management, coaching and problem solving).
- In the scenario, the assigned leader does not fill the relevant leadership function, but somebody else steps in.

We invited our new subjects to engage in a thought experiment and react to the examples. We asked if they recognized the situation that triggered an intervention, and the intervention itself. We hoped that this would tell us how typical the triggering situations and the leadership redundancy interventions might be.

In addition, we asked the informants for their evaluation of the illustrated interventions, and the reasoning behind those evaluations. We hoped that this would give us information about mindsets and tacit rules in the culture and potential problems with informal leadership redundancy as a capacity for flexible response.

Our experience shows that:

- We could focus the attention of subjects and get their reactions in ways that are relatively easy to compare
- Since the examples are ‘historical’, subjects could choose how much they wanted to open up about their own personal experiences, and still give concrete reactions to a situation close to their own reality.
- The informants engaged freely and pushed back on the realism of the triggering situation or the interventions that they found in the cases. A concern that we had discussed in the beginning (that the stimulus cases might be too leading) seems not to have been justified.
- The focused stimulus cases allowed us to cover more ground in a shorter time than we could in traditional interviews.
- The interviews did not yield many *new* examples or analogies of other instances of leadership redundancy.

Selection of Informants and Contexts

Starting in June 2011, two researchers conducted a series of visits to IMR vessels when they were in port (in Norway and in Scotland). Such a port call gave us research periods ranging from a few hours to two days. All vessels are under Norwegian ownership and legislation.

Each context has the same inter-organizational configuration: a *client* hires an *subsea contractor* who hires a vessel from a *shipping company*. In addition, the client will hire specialists directly (*third parties*).

In the interest of getting in-depth descriptions of one setting we chose to continue investigations on the vessel where the original field study had taken place, and on two of its sister vessels. For contrast, we also did the same data collection on vessels from two other shipping companies.

Port calls in this business happen at crew changes (typically once every two weeks) or when the vessel needs repair or supplies. Vessels of this kind rarely know exactly where and when they will call on a port until a day before. The uncertainty comes from changing operational priorities and unstable weather. For that reason, researchers had to be able to move in on very short notice, and to sometimes accept that the vessel had been directed elsewhere when we arrived at a base. When in port, crew and officers are very busy. Though interviews were squeezed in on such days, they largely could go undisturbed.

We chose informants that all were directly or indirectly involved in the execution of the operation, and who represented a role that hoped would have information on one or more of the cases.

All who were asked were willing to talk. Practical concerns during the mobilization phase dictated who we could reach and for how long. Those interviewed were captains, client reps, offshore managers, project engineers, medics, shift supervisors, ROV supervisors and one deck foreman.

The recording of one offshore manager interview was damaged and the content lost. We also found that we could leave out the captains from the analysis reported in the present paper. Since the cases mostly concern the operational part of the organization, captains turned out to have limited knowledge of them. This left us with 35 relevant interviews.

Procedure for Analysis and Validation

A sample of interviews was discussed in a meeting in December 2011, and a draft for coding categories and an analysis template was constructed and later refined by one of the researchers (see Appendix 2). It was used so that each interview would be analyzed independently by a minimum of two researchers and subsequently discussed in validation meetings until consensus could be reached.

The template presented here (see Figure 1) was revised one more time after the first validation meeting. A research assistant was trained to help with the validations of the interviews. There were eight validation meetings in total.

The template served as a heuristic tool for two purposes. The first was to test if we have proof for the phenomenon of leadership redundancy. The second was to explore the reasoning that led informants to rate each intervention as productive, unproductive or conditional. The hope was that the second line of exploration would add to our understanding of the dynamics of the operations.

The procedure consisted of these steps:

Each researcher would apply the template for an interview individually. Each case within the interview was analyzed in the same way.

Each template summarizes the analysis for one interview. The score for each case was indicated by putting the case number in the appropriate place in the table on the first page. For example, if an informant reported having observed the scenario in case #1, the case number would be recorded in the cell defined by column 'check' and row 'I have seen it'.

'Confirmation' answers were classified as an observation ('I have seen it'); as participation ('I have done it', only applicable if the informant belonged to the same role as the interventionist in each case); or an assessment as plausible ('it could have happened').

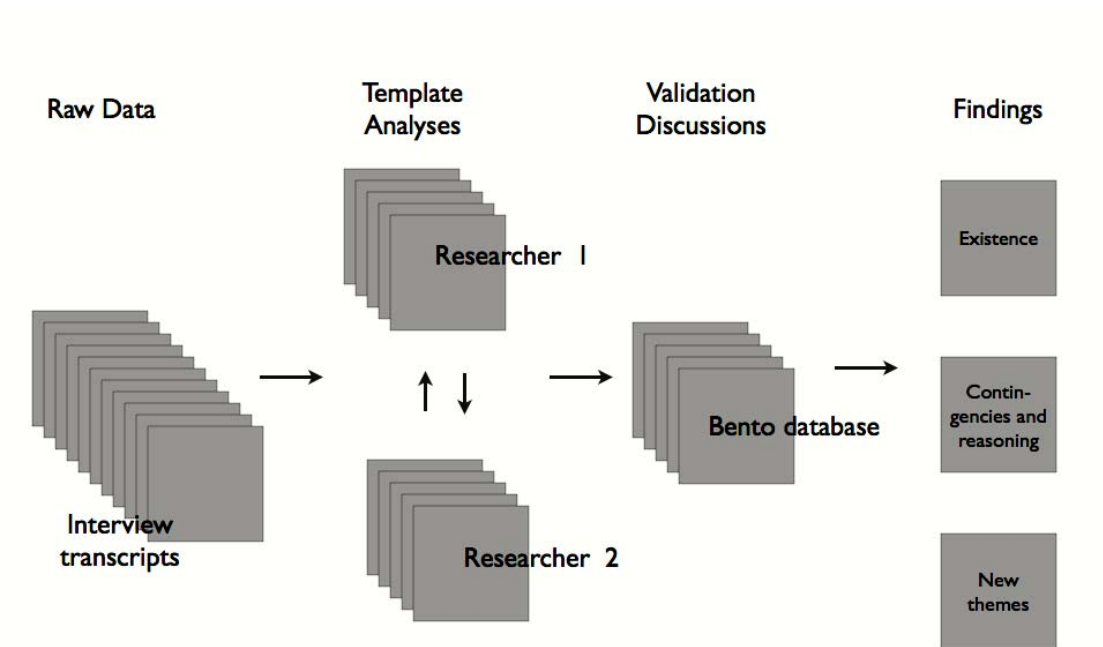
Similarly, if an informant rated the scenario as not observed, or as not having been active in this kind of intervention, the original plan was to rate these columns in a similar way. This category turned out to be redundant, since the absence of a positive rating under 'confirmation' contained the same information. The last category 'it could not have happened' was however used for those informants that explicitly evaluated a case scenario as unrealistic.

The 'evaluation' columns scores for the informant's evaluation of the intervention described in each case. The evaluations were scored as positive or negative or as uncertain. When the interview transcript showed an evaluation that was considered unambiguously positive or negative by two independent raters, they were scored as such. In cases of doubt, they were scored in the last category, illustrated by a 'question mark'. This was also used when the informant made the evaluation conditional (dependent on additional conditions), or where the informant was undecided.

For each score, the template invites the researcher to add notes. The notes consists of the researcher's own notes and a selection of the relevant quotes, thus including the researcher's thinking and the underlying data. Each data point or quote is identified with a code (informant code@text navigation point, e.g. 'SS04@019').

We wanted to understand the informants' reasoning, in particular on their evaluation of the case, hence question 2: 'What is the logic behind the informant's evaluation of the case, including contingencies' that aims to discover why the informant might regard an intervention as appropriate, and who the appropriate interventionist(s) might be, under what conditions.

Figure 2: The Flow of the Data Analysis



Each researcher used the template to score and describe his or her findings in each interview.

Pairs of researchers came together in validation meetings, read each other's analyses and discussed them. Discussions continued until consensus was reached in each case. Concerning the existence proof, we remained conservative in our scores of the cases. For example, we would only score as 'have seen it' an instance when the informant explicitly said that he or she had observed the intervention described in the case by people in the same role as the interventionist in the case.

A Bento² database was created to keep track of the results of the meetings.

One of the researchers created the present summary document. It gives an overview of the findings relevant to the paper on informal leadership redundancy. This document was double-checked by the research assistant for accuracy.³

² Bento is a simple, Mac based database tool.

³ Some more detailed notes on the technicalities can be found in the memo: Notes on Using the Templates, March 1st, 2012.

Findings from the Stimulus Case Analyses

In this section, we present findings based on the data collection based on stimulus case interviews carried out from June to December 2011. On seven visits to IMR vessels during port calls, two researchers conducted individual and group interviews.

Our examples all relate to the key role of the shift supervisor. In our field study we had found that a shift supervisor tends to be occupied with task coordination while the operation is in progress. Yet unforeseen and unpredictable events that can disrupt the coordination of the operation do occur.

When that happens the shift supervisor may be unaware of these events, given his confinement in the control room, even if they fall under his purview. A disruption can trigger a need for other leadership functions, but the shift supervisor may not have the necessary time or cognitive capacity to attend to them.

In our field study (Johannessen et al., 2012) we had observed that other members of the multi-team system with the capacity, skill, and authority (though not formal responsibility) sometimes stepped in to address the situation. We referred to this excess leadership capacity in a multi-team system as informal leadership redundancy.

In the current research we use stimulus cases to confirm or disconfirm the need for and existence of this resource, and to explore how members of the industry perceive it. The data reported in this section are mainly from the stimulus case interviews that were specifically designed to test the existence and explore the possible functioning of leadership redundancy.

Some of the data are presented as quotes, broadly sorted by themes. These quotes are given consecutive numbers (e.g. Quote 4) and are connected to an informant (e.g. shift supervisor 07). In some cases, we report findings from the interviews by paraphrasing, and occasionally refer to specific points in our database (e.g. SS07@0030).

Constraints on the Shift Supervisor's Role

The new interviews confirm our observation in the field that, for the duration of the operation, the shift supervisor is, for the most part, physically confined to his control room, both for legal and practical reasons (Quote 1 and 2). Several informants say that this confinement limits the shift supervisors' ability to know at all times what is going on, e.g. in the ROV control room or on deck. However, this depends on whether the activity is visible on CCTV, and on how close the shift supervisor's control room is to the ROV control room. On some ships the two control rooms are near each other, while on others they are far apart.

The interviews also confirm that the shift supervisor's attention is mostly focused on task coordination during the execution of the operation (Quotes 3-5), so that he cannot easily attend to other leadership functions while the operation is in progress (Quote 6). Shift supervisor 04 is more optimistic than others about the chances of attending to coaching in the midst of an operation, but he also underscores that he cannot leave the control room (Quote 2).

On the other hand, many anecdotes suggest that the shift supervisors see themselves as more than task coordinators. For example, a shift supervisor who rates his chances of coaching an ineffective deck foreman in the midst of the operation as low, still sees cultivating a long-term cooperative relationship with the him as a crucial task, since the deck foreman is the shift supervisor’s “eyes and ears on deck” (Shift Supervisor 03). Coaching or learning conversations, however, cannot take place in the midst of the operation, according to this shift supervisor, but need to happen during mobilization, when he can move around freely.

Table B: The Shift Supervisor’s Role

Topic	Illustration
Limited degrees of freedom	<p>Quote 1 <i>I can join the (people in) the ROV (control room) for 10 seconds, this means that you can give a message or a hint, or whatever it is, but then you need to go back in again (to the shift supervisor’s own control room). We have legal obligations and rules that we can’t leave our post as long as we have things (equipment submerged) in the sea.</i> Shift Supervisor 03 in Case #1</p>
	<p>Quote 2 <i>(...) our guidelines are such that the shift supervisor can only be replaced by the offshore manager, so when you’re sitting there for twelve hours, the offshore manager may come without you’re asking, or you need to call and ask him, the only off time you get is going to the loo or eating. Well, you can go out for a smoke. (...) During the operation you are stuck here, and Statoil, the client, require that.</i> Shift Supervisor 04 in Case #2</p>
Competing demands on the shift supervisor’s time and attention	<p>Quote 3 <i>(...) a shift supervisor coordinates the ROV, the third parties, he coordinates deck. And the tower (crane operator) of course. And in most, in many cases the third parties are sitting inside directly with the ROV (pilots) to get things done, so that they have a direct tone (verbal communication), and need less communication via intercom on board.</i> Shift Supervisor 05 in Case #1</p> <p>Quote 4 <i>The shift supervisor is often busy, this varies between operations, but he may be busy with other things, what is going on right now. All the others, engineers, the OM, the client are those who run around thinking about the next, so, I would say that the engineer has much of the responsibility of what happens in the next phase since he is responsible for the task plan and what we’re going to do in the next phase, and then the shift supervisor runs the show (once we get there).</i> Project Engineer 10 in Case #7</p>

Table B: The Shift Supervisor's Role

Topic	Illustration
<p>Competing demands on the shift supervisor's time and attention</p>	<p>Quote 5 <i>The shift supervisor has lots of other things to consider. He's got the vessel and the vessel movements. He's got the deck and the deck movements. He's got the crane and the crane movements. He's got one or two ROVs. That's five or six different departments he's trying to coordinate all at one go, plus reading the task plan, plus carrying on the job. So, there's quite a lot of information to take in and also to pass out. If you're the best (...) in the world and you're working twelve hours a day, seven days a week, you will miss something. You'll never, ever get it right all the time. All you've got to do is try and do your best. There will be instances where you do miss something.</i> Shift Supervisor 07 in case #7</p> <p>Quote 6 <i>(...) he does have the overall responsibility to keep the operation running, so he can't sit down and spend a lot of figuring out how we'll get this bolt loose since he has several parallel systems submerged that need to be operated, he has a rig or one other vessel to take into account in the totality of the operation. So it is not his task. He is meant to lead the operation, that's his task.</i> ROV Supervisor 04 in Case #7</p>

Exercise of Leadership Functions

The stimulus cases below are based on situations taken from our field research (observations and interviews). Each case illustrates a situation that could jeopardize the success or safety of the operation, and the exercise of a leadership function - beyond the coordination focus of the shift supervisor - to remedy the situation. Case #1 involves protecting the boundary around a team of pilots who are responding to an accident, so that they can work undisturbed. Case #3 involves providing coaching to a deck foreman who is not managing his team effectively. Case #7 involves discovering and solving a technical problem that could negatively affect the next phase of an operation. In each case, someone other than the person we understood to be formally responsible takes the initiative to intervene. We asked our research subjects to give their views on how realistic the situation was, whose responsibility it would normally be to manage this situation, why intervention would be necessary, and their evaluation of the intervention described in the case scenario.

Boundary management 1 (Case #1)

Maintaining the boundary around a team can be important to protect it from interference. In this case, a minor accident has happened and one part of an operation has to be put on hold while an ROV is brought to the surface for repairs. The incident is not critical, but also not trivial; the possibility of pollution is taken seriously; an interruption costs money; and the (unlikely) loss of the robot would cost a million dollars and cause further delays. A client rep who is in the ROV control room starts a discussion about what led to the accident while the pilots are still hard at work containing the immediate damage. An offshore manager sees this as an inappropriate disturbance, and guides the client rep away to an adjacent room to continue the discussion.

Table C: Confirmation of the Intervention in Case #1

Role	Observations			Plausibility			Sum
	Has seen	Has done	Has not seen or done	Could have happened	Could not have happened	Missing data	
Client Rep	0	0	0	5	1	0	6
Offshore Manager	0	0	0	4	0	0	4
Project Engineer	1	0	1	3	0	0	5
Medic	1	0	2	3	0	0	6
Shift Supervisor	3	0	0	5	0	0	8
ROV Supervisor	5	0	0	0	0	0	5
Deck Foreman	0	0	0	1	0	0	1
Sum	10	0	3	21	1	0	35

Informants confirm that the context and the triggering situation are realistic. Technical breakdowns that need to be contained do occur, and there is consensus that discussing why the accident happened before it is contained is problematic and needs to be interrupted so the team can focus on the recovery of the ROV (Quote 7). All but one informant see the behavior of the client rep in the scenario as inappropriate.

Table C shows a classification of responses about the intervention in the case scenario (not the triggering situation). Informants that explicitly reported an observation of a similar real life event are classified as such. Others, who have not reported an observation but have explicitly said they thought the intervention could or could not have happened are classified under 'plausibility'.

Most of the informants, regardless of their role, say that they have either seen this type of disturbance handled like this, or that they think it could happen.

In their evaluations of the action taken by the offshore manager most informants see it as positive (including all the client reps interviewed). There is more variance in opinion amongst the informants as to whether disturbance of this kind can be expected from a client rep, and, if so, how frequent it may be. The client reps tend to see it as unlikely or infrequent. Among those who

think it is likely, only one offshore manager says that this happens ‘frequently’. Some informants describe the behavior in the scenario as that of an inexperienced client rep.

Everyone, including the client reps, say that the shift supervisor is primarily responsible for maintaining this boundary (Shift Supervisor 08 said that he would do so 90% of the time), but that, in principle, anyone, including the ROV supervisors or the pilots themselves, could intervene with the client rep. No one said there was a problem with somebody else stepping in for the shift supervisor in this situation, but there is variance as to how much courage informants think it would take (see Quotes 9 and 10). The role of the informant does not affect their perception and evaluation of this situation.

As we saw in the discussion of the shift supervisor’s role, his ability to intervene is limited by the competing demands on his time and attention (in this case, keeping the rest of the operation going while two of the pilots are salvaging the damaged ROV); by his physical location; and by his legal obligation to remain in his own control room (see quotes 1, 3 and 8).

Responses to this case confirm that disturbances requiring boundary management are realistic in the world of IMR operations. At times, the capacity and ability of other individuals to step in for the shift supervisor enable the system to cope effectively.

Table D: Boundary Management

Topic	Illustration
Why the boundary must be managed	<p>Quote 7 <i>I would take them out of the way. The priority, in my mind, is to contain the incident, stop what's happening, argue about it by all means but somewhere else at a later date. [I'm?] going to stop casting blame or whatever or trying to stop that, by all means do, but at a later date or further away. At the moment, it's containing the incident and stopping the problem from getting worse.</i> Shift Supervisor 07</p>
	<p>Quote 8 <i>Technically, the shift supervisor should probably have drawn the line as well and moved him away from the situation. However, the Senior ROV Supervisor is probably more concerned about what's going on in front of him. The shift supervisor is probably in that situation as well, wondering what's going on; whereas the Offshore Manager is probably more able to get an overall impression, just take a step back, and let his guys deal with it—as long as he knows what's going on and [2 words] to take that guy aside.</i> Medic 06</p>
Others than the shift supervisor might intervene	<p>Quote 9 <i>It could be the ROV supervisor, and ROV pilots with some gravitas ('pondus'), typical trainees would not do this.</i> Project Engineer 10</p>
	<p>Quote 10 <i>Yes, such things happen. That there are many people around that can be a disturbance (...). If the Offshore Manager is around, he would automatically take the initiative. If he is not, then I would, if I were there, politely give them feedback and say that they are not wanted here now since they are an extra stress factor for those conducting the operation. So, if I'm not there then it's guaranteed that the assistant (ROV supervisor) or the pilots would (draw the line), they are so confident.</i> ROV Supervisor 07</p>

Coaching (Case #3)

The deck on an IMR vessel can be a confusing place, often noisy, full of equipment, cranes, ROVs and people engaged in a variety of simultaneous tasks. Work on deck is the most immediately dangerous part of IMR operations. Shift supervisors consider the action on deck as critical for safety and the flow of the operation, but have limited ability to control it directly. They therefore rely in large measure on competent deck foremen (Quotes 26, 27).

In Case #3, a medic notices over a couple of days that a new deck foreman seems to be neglecting his leadership duties with his inexperienced riggers. It looks like he is performing the work on deck himself, while the riggers stand by idly. The medic gets concerned and takes the initiative to speak privately with the deck foreman, who indicates that he is open to feedback.

Table E: Confirmation of the Intervention in Case #3

Role	Observations			Plausibility			Sum
	Has seen	Has done	Has not seen or done	Could have happened	Could not have happened	Missing data	
Client Rep	0	0	3	2	0	1	6
Offshore Manager	0	0	1	3	0	0	4
Project Engineer	0	0	2	3	0	0	5
Medic	1	0	1	4	0	0	6
Shift Supervisor	2	0	4	2	0	0	8
ROV Supervisor	0	0	3	2	0	0	5
Deck Foreman	0	0	1	0	0	0	1
Sum	3	0	15	16	0	1	35

Case# 3 is the most controversial on several dimensions. Five of the eight shift supervisors directly confirm that this type of situation (inexperienced riggers, and a deck foreman who fails to delegate and put them to work) does occur, and is a plausible concern (Shift Supervisors 04, 05, 06 07 and 10). One shift supervisor confessed to making this mistake himself when he was a deck foreman earlier in his career. He attributed it to a time/efficiency tradeoff; it may be faster and safer for a deck foreman to do the work himself than to get new riggers up to speed (Shift Supervisor 06). However, five informants questioned the realism of the situation. In their experience, it would be unlikely to have both an inexperienced deck foreman and inexperienced riggers on deck simultaneously.

Realism aside, of the 30 informants from whom we have data, 13 see the intervention as positive and 17 have a mixed (11) or negative (6) evaluation.

Those who favor the intervention cite several reasons: the situation is potentially dangerous given the many hazards on deck (Quote 31); feedback from the medic may be experienced by the deck foreman as less threatening than feedback from his direct supervisor (Medics 08, 03 and 04, Project Engineer 10, Shift Supervisor 05); timely intervention by the medic could prevent the situation from escalating (Client Rep 09); and the intervention enables the medic to test his assumptions about the situation (Medics 03, 05 08). Several who favored the intervention cautioned that the medic should first check the facts (given that Medics are not typically experienced in deck operations). Others said that the medic might actually need to intervene more immediately and forcefully if he perceived an imminent threat to the safety of the deck crew (Project Engineer 09, Client Rep 04).

From the medics' perspective, five of the six we interviewed said that medics should be proactive in situations that have the potential to threaten the safety of the crew, and that giving feedback to a deck foreman in this situation is appropriate. They emphasized, however, that, given the formal command structure on an IMR vessel, their intervention could include involving the deck foreman's supervisor. One medic joked that the likelihood of a deck foreman accepting the feedback was about 50/50 (Medic 05).

Those who did not favor the medic's intervention said that it is beyond the medic's mandate, training and experience to give feedback to a deck foreman on how he leads his crew (Offshore Manager 03, Medic 06 and Quotes 30, 31 and 32)⁴. Formally, the deck foreman reports to the offshore manager, and, during the execution of the operation, all team leaders are under the command of the shift supervisor. Therefore, from this perspective, either the shift supervisor or the offshore manager is the appropriate person to coach the deck foreman. However, there is not a consistent view about which of the two has primary responsibility, which suggests a lack of role clarity in the system.

Five of the client reps, both offshore managers, one shift supervisor, and one ROV supervisor see the offshore manager as having primary responsibility for coaching the deck foreman. Seven of the shift supervisors say that the shift supervisor is the right person to coach the deck foreman, with the option of taking it to the offshore manager if coaching is not successful. The deck foreman we interviewed thought that the shift supervisor should be the primary person to intervene, while the offshore manager had secondary responsibility. As he commented, "(...) That feels like the right sequence. The medic shouldn't be involved in it, really" (Deck Foreman03@0008).

Aside from the issue of who is responsible, there is also the issue of who is aware that the deck foreman is having difficulty. Four shift supervisors thought that they (or an offshore manager) would or should have noticed, and handled the problem on deck themselves, if it became evident

⁴ While 'coaching the deck foreman on coaching' is the intervention suggested in the scenario, some informants pointed out other possibilities, such as moving people between shifts, e.g. get a more experienced deck foreman on night duty to take over.

during mobilization. The scenario, however, is based on a situation where the problem became evident during the execution of the operation, during which the shift supervisor is confined, for the most part, to his control room. Two shift supervisors doubted that, in this situation, they would have picked up the problem on their own (shift supervisors 06 and 08), and that it would be difficult for the shift supervisor to deal with it himself in the midst of an operation (Quote 26 and 27).

Table F: Case #3 Coaching 1

Topic	Illustration
<p>The situation on deck is important, but hard to control for the shift supervisor</p>	<p>Quote 26⁵ <i>I would - in my experience, when you come to a new place, one of the first that I get in touch with and try to get to know is the deck foreman. For he is my eyes and ear on what goes on on deck. And that relationship needs to be based on mutual respect. If I notice that this is an inexperienced, recently promoted person that tells me to spend more time on deck, to get the job done, you might say. People are different (...) some may be good as deck foreman, but bad at handling people. I need to form an opinion about that very quickly to make it work.</i></p> <p>Shift Supervisor 03@0023</p> <p>Quote 27 <i>(...) I have no way of picking up this situation, I can of course see them on deck when I'm working with the camera, but I'm paying attention to other things also, so it's not certain that I see the situation for what it is, so since these riggers are new, I'm not sure that they would have come to me and said anything about it either.</i></p> <p>Shift Supervisor 06@0008</p>
<p>The medic's potential lies in his skills and his open mandate</p>	<p>Quote 28 <i>The advantage is that he comes in from the side as a fellow traveller you might say, a peer, this is not the offshore manager correcting, a superior (...) the medic has so little to do on these vessels that he is the only one who has the time for these things, he can be a researcher of sorts.</i></p> <p><i>So he can observe things, he can write cards about it, observation cards that concern individuals, it is a good thing to raise that under four eyes and say what he has observed and check if he has seen correctly. I think that it is great to ask questions like that. (...) If you give feedback to the person next to you they may hear it as criticism (...).</i></p> <p><i>Even if it is constructive and well intended some may take offense, but that's the way it is. So that's a barrier to doing it, but maybe that medic was thinking it's part of my job, he sees it as his mission to walk around and observe.</i></p> <p>Project Engineer10@0007-0008</p>

⁵ The jump in quote numbers happens since the presentation of findings on Case #2 have been removed in the second edition of the present report.

Table F: Case #3 Coaching 1

Topic	Illustration
	<p>Quote 29 <i>Speaking from the point of view of this type of vessel and what we do, the Medic is supposed to be impartial. He tends to get on with most of the people, and he's supposed to be without fear or favors when they speak to the medic himself. So that is an independent person who can go and speak to different people, which is fine in my view. So the medic can go and speak to one of the riggers or me, or whoever it may be. Maybe there is a problem. I don't know. But the medic is free to (...) go speak to anybody and ask them any questions like that. Personally, as a chain-of-command thing, I don't think that's a problem for the Medic.</i></p> <p>Shift Supervisor 07@0011</p>

On the one hand, the development needs of the deck foreman may be the responsibility of his formally designated leader, whether it be the offshore manager in general, or the shift supervisor during the course of the operation. Yet, many informants say that the inability of the deck foreman to manage his crew effectively is a potential safety hazard, and as such, needs immediate attention. If the formally designated leaders are unaware of the problem, or are unable to handle it, then the medic's capacity, willingness, and skill to do so is a potential additional leadership resource that enables a multi-team system such as this to cope with surprise. The leadership deference is not necessarily to expertise, but to capacity.

Informants often express the ideal of collective responsibility for safety; that no one can stand idly by and let a safety concern slide, regardless of their roles. Resourceful medics take active part in shaping their roles, which are somewhat ambiguous in the flux of day-to-day operations. They represent a resource that may occasionally fill leadership functions, but that may be controversial.

Table G: Case #3 Coaching 2

Topic	Illustration
<p>Ambiguities in the medic's role</p>	<p>Quote 30 <i>It is a good thing that the medic observes, that's his job and he is an HSE advisor, so that is only positive. But I don't think that it is right that he goes straight to the deck foreman to talk with him about how he does his job. It would have been more appropriate to come and talk with us who are responsible for deck. Either talk to me or to the offshore manager if he has a concern.</i> Shift Supervisor10@0011</p> <p>Quote 31 <i>Well, the starting point is that [the medic] is out observing, but that he goes and talks with [the deck foreman] under four eyes is unusual. He might well, he has the time, if it jeopardized safety he might have flagged it earlier and spoken with the offshore manager, since the deck foreman and the riggers report to him. Because it is [problematic] to be a leader and also carry out the work, you can easily go wrong with safety and loose the overview over the whole operation. Then, nobody is paying attention. So if [the medic] is standing behind and looking at the whole scene [the medic] might have waited until the end of the shift, and then spoken with the offshore manager and the deck foreman. If it was a very critical operation he should have interrupted the right there and then.</i> ROV Supervisor 07@100</p>

Table G: Case #3 Coaching 2

Topic	Illustration
<p>Ambiguities in the medic's role</p>	<p>Quote 32 <i>Yes, I have seen some borderline cases, you might say. Where some find it easier to do the work themselves, rather than training new people. That happens.</i></p> <p><i>Researcher:</i> <i>And that a Medic takes on a sort of coaching role, have you seen that also, or not?</i></p> <p><i>Offshore Manager 06:</i> <i>Sure. I see that, too. It happens on this vessel also, but in many cases he will consult with me at the same time. We have [open channels] , you know. That I would be informed, if anything...</i></p> <p><i>Researcher:</i> <i>Let's say you wanted to teach a new medic to do his job right, how would you explain to him that in this case, he should have come to you first (...) what would be the rule he should have in his head?</i></p> <p><i>Offshore Manager 06:</i> <i>That's a little intricate and a good question. Well, if he sensed that this would jeopardize safety, meaning that people were not in full control over the deck, then I would have wished (...) if you observe such things (...) I need to know that, we can't have that. (...) I need to be informed if such things happen, and for the medic to step in as a kind of leader trainer...that can't be right.</i></p> <p><i>Researcher:</i> <i>No, so that would be crossing a line?</i></p> <p><i>Offshore Manager 06:</i> <i>Yes, I think so.</i></p> <p>Offshore Manager 06@340</p>

Problem solving (Case #7)

In case #7, a client rep notices a technical problem with a guide post⁶ that had not been anticipated in the plans and that would affect the next phase of the operation. This client rep takes the initiative to solve the problem with the offshore manager and others, and engages in developing a solution that is eventually turned into a new task plan. The scenario does not specify any involvement of the shift supervisor, but the client rep is quoted as saying, “Strictly speaking, it is the shift supervisor’s responsibility to anticipate challenges and make sure that the work moves smoothly from one operation to the next. But we all need to be able to step in when necessary.”

⁶ A guide post is a slide fastened on the subsea installation that guides tools and components from the vessel into the right place.

Table H: Confirmation of the Intervention in Case #7

Role	Observations			Plausibility			Sum
	Has seen	Has done	Has not seen or done	Could have happened	Could not have happened	Missing data	
Client Rep	1	0	0	2	1	2	6
Offshore Manager	0	0	0	1	1	2	4
Project Engineer	0	0	2	1	1	1	5
Medic	1	0	1	0	0	4	6
Shift Supervisor	1	0	3	1	0	3	8
ROV Supervisor	1	0	1	3	0	0	5
Deck Foreman	0	0	0	0	0	1	1
Sum	4	0	7	8	3	13	35

We have 22 reactions to Case #7. The triggering situation - that the realities at a destination can be different from those anticipated in the plans - was not contested by any of the informants (e.g. Quote 33).

Twelve say that they have either seen a client rep intervene in this way, or that it could have happened. Seven have not seen it, and three think it could not have happened at all. Those who thought that it was unlikely cited two reasons: 1) the level of active involvement of the client rep seemed to be going too far, and 2) the shift supervisor seemed to be excluded from the problem solving process, and a formal Management of Change (following the procedure to change procedures) seemed to be missing.

In the scenario, a client rep notices a problem and contributes to solving it. Taking initiative to solve problems is a widely held value in these operations (Quotes 34, 35 and 42), and is considered an obligation if the problem is a safety issue. However, one shift supervisor thought that this kind of action on the part of a client rep would be infrequent since, as he said, “a client would know that it was outside his remit” (Shift Supervisor 08@0019). One shift supervisor suggested that this client rep, by becoming “too hands on”, might make the oil company liable for possible mistakes (Quote 40).

There is, however, wide recognition that a problem of this kind might be hard for a shift supervisor to notice or handle (Quotes 4, 5, 35 and 36) for several reasons: 1) he does not have time to deal with technical issues at this level of detail (Quote 6 and 37), 2) the attention to coordination may give him tunnel vision (Quote 36), and 3) he may not have the right background for this particular challenge (Quote 39 and 40).

This case, like Case #3, got mixed evaluations. Eight give a positive evaluation of the client rep's intervention and 14 are negative (10) or mixed (4).

Those who are critical read the scenario as bypassing a proper Management of Change that requires deeper involvement of the crew and the shift supervisor. A couple said that there is always the option to stop the operation and have a meeting of all the relevant players, particularly the shift supervisor (Quotes 40 and 41).

Some who react positively read the case as an unusual way of working that still respects proper procedures. They underscore that it makes sense to be pragmatic since the shift supervisor may be too involved in the execution of the ongoing operation. The creative work can flow informally, as long as the offshore manager and the project engineer are involved (Quote 42). Seen through this lens, one project engineer comments that it is great that the client rep "is actively participating and thinks like an engineer" (Project Engineer 10@011).

The informants do not provide a simple or consistent answer to who in this case, is responsible for problem identification and problem solving. Most informants view this as a collective responsibility, except for one shift supervisor who says that that the operation would need to be put on hold and the shift supervisor be put in charge of a full (Shift Supervisor 10@0018).

Clients and subsea contractors alike insist that bad plans from the shore organizations could be to blame, since they had not correctly identified the problem with the guidepost. Many informants see calling attention to problems and coping with them on the vessel as a collective responsibility (e.g. Quotes 33, 37 and 43).

Our data confirm that the coping strategy utilized in the case scenario occurs. As long as a client rep takes care not to overstep his authority (e.g. take work directly to the project engineer) and acts in full understanding with the offshore manager, he may perform parts of the problem solving that in other cases the shift supervisor would perform. In the real situation that Case #7 is based upon, the client rep and the offshore manager thought that they could contribute to the flexible flow of the next step of the operation by performing this leadership function.

Table H: Case #7 Problem solving

Topic	Illustration
<p>Surprises happen and the shift supervisor may need help</p>	<p>Quote 33 <i>Researcher:</i> <i>Have you seen anything like this? Is the sequence of events realistic to your mind?</i></p> <p><i>Shift Supervisor 07:</i> <i>Um, yes, to some degree. Things do get done behind the scenes during operations, because when operations are going on they tend to be a continuous thing. And if something crops up further on down the line, it's up to the people who see it or to the people who can sort that problem out. Maybe they should have asked. From (the case), it seems that nobody has actually spoken to the shift supervisor and said, It's not just his responsibility. It's also the engineer's responsibility to make sure the equipment is fit and functional for the purpose.</i></p> <p><i>If there's going to be a problem, if the shift supervisor [hasn't?] seen it, how come the engineer hasn't seen it either and how come the people who planned the operation haven't seen it? We're now relying on one person to catch the problem before it goes any further. So, it's unfair, I would say just reading this, to blame the shift supervisor for not resolving the problem, which is somebody else's problem in effect. [3 words] Ultimately, it's got to stop with him. After it's been caught by the client and the offshore manager, they're working on a solution. But, the problem should never have occurred in the first place or should have been foreseen.</i> Shift Supervisor 07@0014</p>
	<p>Quote 34 <i>Yes, this is familiar to me. I would say that it is out of the question that I, as the client on board, would sit down and wait for the problem to emerge when I had noticed it. So that action was taken since he noticed it I think is fine. And he contacted the offshore manager to discuss it, that's the natural thing to do, these are proper communication channels. That the offshore manager did not include the project engineer in that discussion of 1 hour and 20 minutes is a little unfortunate. I would say that the (...) engineer should have been part of the dialogue from the beginning. If they had brought together the people that were needed I think that people would have bought in to the solution earlier (...) and you reduce the risk that it feels imposed from above, which I see as a danger here.</i> Client Rep 06@015</p> <p>Quote 35 <i>Sometimes the shift supervisor has already moved from the deck. There's a guide post problem. They're not always on the deck to see everything; whereas you've got deck foremen, riggers, engineers, and so on, who hopefully catch it before that, which does happen on lots of occasions. There'll be something that's going to happen and, hopefully, the deck foreman has a good enough working relationship with the shift supervisor to go and say, "Look, we're going to have a problem with this."</i> Shift Supervisor 07@0016</p>

Table H: Case #7 Problem solving

Topic	Illustration
<p>Surprises happen and the shift supervisor may need help</p>	<p>Quote 36 <i>It is a fact that if you are very focused on a task your vision can get quite narrow, and you may not notice the obstacle outside your visual range. But those sitting a bit on the sideline of the operation may notice it.</i> Client Rep 04@0016</p>
	<p>Quote 37 <i>Of course it is part of the shift supervisor's job to think ahead, but could he in this case have predicted it? Had he received enough good information from the client (Statoil) in advance?</i></p> <p><i>If yes, then maybe. It depends what the problem with the guide post is (...) The shift supervisor has his hands full with the operation. He can't sit down to solve such a problem.</i></p> <p>Client Rep 09@110-120</p>
	<p>Quote 38 <i>Not all shift supervisors have the technical background for solving all the technical tasks - they have varied backgrounds, some shift supervisor come from the ROV side, others come from totally different administrative tasks and have been given this position.</i></p> <p>ROV Supervisor 04@0010.</p>
	<p>Quote 39 <i>Maybe your shift supervisor has come from being a survey guy, which happens. They've got no deck experience, so they don't know how it's supposed to be. Maybe the shift supervisor has come from the deck and doesn't know how the survey works, or the deck and is not 100 percent sure how the ROV works. You can't have a shift supervisor who's been in charge of survey, in charge of ROV, in charge of deck, and in charge of the ship. You can't have somebody who's been in charge of all the departments because that would be the perfect person and we don't have that. We have people who tend to be quite good at what they do in their department who then get promoted up, and then you have to learn what other things happen.</i></p> <p><i>If this guy had come from the deck department, maybe he would have seen it. If he didn't, whether or not, he might have been an ROV supervisor who had been very good at managing people and being an ROV supervisor who then got promoted to shift supervisor.</i></p> <p>Shift Supervisor 07@0016</p>

Table H: Case #7 Problem solving

Topic	Illustration
Concerns about the strategy in the scenario	<p>Quote 40 <i>(...) if anything had gone wrong from (the client rep's) making, it would have highlighted the situation even worse because he was doing something that he shouldn't have done, really.</i></p> <p>Shift Supervisor 08@0018</p>
	<p>Quote 41 <i>We are taught that everything is to take as long as it needs. So (the shift supervisor) should have been involved in any case, I think.</i></p> <p>ROV Supervisor 05@0009</p>
The client rep may be a resource	<p>Quote 42 <i>The client probably did the right thing (...)</i></p> <p><i>There are some clients who'll come up and start screaming and shouting about it—they're doing nothing about it but screaming and shouting. That's the worst, whereas this particular one has made the effort, spoken to the people, and had the problem resolved with foresight and got it sorted.</i></p> <p><i>Say you're working on a jigsaw puzzle. When you're that close to the jigsaw puzzle, you can't see all the pieces. You can't see the ones over there. If you've just come into the room, you can say, "Hey, you're missing a piece. It's over there." It's as simple as that."</i></p> <p>Shift Supervisor 07@0017</p>

Appendix 1: Stimulus Cases and Interview Guide

A small pool of cases was developed based on the preliminary findings from the 2009 field trip. These were discussed with insiders in the business for consistency and accuracy of contextual detail. We performed a test run for this kind of data collection in June 2011. We found that one of the cases (#4) was less suited for testing the existence of leadership redundancy, and we replaced it with #7. The other cases were modified to reduce sources of misunderstandings. The new versions below (#1, 2, 3 and 7) were used in the rest of the data collection (the informants had the option of reading scenarios in English or Norwegian). The interviews based on case #2 were later excluded from our analytical work, since colleagues argued that it was ambiguous as an example of informal leadership redundancy (see Foreword to the second, revised edition of the present report).

Case #1

During an operation to recover an FCM from a template⁷, there is a sudden leak of hydraulic oil from a manipulator on one of the ROVs. Oil spills directly into the sea under a pressure of 120 bar while being emptied.

The client rep, the third party experts and the senior ROV supervisor are present in the ROV control room. The offshore manager has just arrived. The shift supervisor is in the adjacent control room, busy containing the damage while keeping the operation in motion.

The client rep starts a discussion about why and how the incident could happen. He uses a critical tone and tries to engage the pilots in a discussion. The offshore manager interrupts the conversation, and quickly guides the group away to a different room to continue there, leaving the pilots behind to go on with their work. Two pilots continue working with the intact ROV while the other pilot team recovers the leaking ROV to the surface for repairs.

Interview guide:

- Have you seen leading personnel intervene (such as the OM did here) on your vessel?
- What are the advantages and disadvantages of handling the situation like the OM did?
- Can you imagine a different way of handling it that you would recommend more?
- Have you heard of such a thing occurring on your vessel or on a different vessel?
- If no: Do you believe it might happen?
- Can you describe a different example that this reminds you of?

Case #2

The license rep is talking to a shift supervisor to influence him to take on more responsibility for specific part of the pumping operation in a scale squeeze⁸. This lies outside his normal duties.

⁷ A tool from the sea bed.

⁸ An operation to clean the access to a well.

But this shift supervisor is on the verge of giving in to the request, meaning to accommodate the client.

The offshore manager arrives at the scene. He makes clear that the shift supervisor is under no contractual obligation to do as told, and, moreover, that he does not have the necessary skills. The appropriate way to perform the operation is to use the whole team, including the vessel pumping crew and the third party supervisor. The license rep accepts the offshore manager's intervention.

Interview Guide:

- Have you seen leading personnel intervene (such as the OM did here) on your vessel?
- What are the advantages and disadvantages of handling the situation like the OM did?
- Can you imagine a different way of handling it that you would recommend more?
- Have you heard of such a thing occurring on your vessel or on a different vessel?
- If no: Do you believe it might happen?
- Can you describe a different example that this reminds you of?

Case #3

The medic has time to walk around and have informal contact with people, and is more likely than many others to pick up early signals of problems and needs. He notices the new deck foreman talking with his two riggers⁹. The riggers are new; the medic has not seen them before. The deck foreman walks over to a small crane and begins to operate it, while several other operations are in progress on deck. It strikes the medic as odd that the riggers are left standing idly behind.

Over several days, he notices a pattern, and gets concerned. The deck foreman does not seem to fill some of his leadership role; of keeping an overview, having an eye on safety, delegating duties, and coaching the new riggers when needed. The medic decides to see if the deck foreman may be open to some feedback and advice himself, and asks to talk with him in private when he is off-duty. The deck foreman turns out to appreciate this opportunity to talk to someone about his work.

Interview Guide:

- Have you witnessed a medic intervene like this on your vessel?
- What are the advantages and disadvantages of handling the situation like the medic did?
- Can you imagine a different way of handling it that you would recommend more?
- Have you heard of such an intervention occurring on your vessel or on a different vessel?
- If no: Do you believe it might happen?
- Can you describe a different example that this reminds you of?

⁹ Deck hands.

Case #4

While the operation is ongoing, the offshore manager is not as tied up in so many specific operational duties as the shift supervisor. He needs to be available if contractual issues arise, but he can move around physically and to some degree choose how he spends his time.

One offshore manager describes how he can support the on-going operation, especially if it is a difficult one. He contributes to an informal atmosphere by dropping jokes and making supportive comments. He believes that this puts the pilots at ease and helps boost their confidence. This, in turn, may have a positive effect for safe operations, he believes.

Interview Guide:

- Have you seen leading personnel intervene (such as the OM did here) on your vessel?
- What are the advantages and disadvantages of handling the situation like the OM did?
- Can you imagine a different way of handling it that you would recommend more?
- Have you heard of such a thing occurring on your vessel or on a different vessel?
- If no: Do you believe it might happen?
- Can you describe a different example that this reminds you of?

Case #7

A client rep gives an example of when they became aware of an unresolved problem in an upcoming operation. It concerned one of the template's guideposts¹⁰. He commented: "Strictly speaking, it is the shift supervisor's responsibility to anticipate challenges and make sure that the work moves smoothly from one operation into the next. But we all need to be able to step in when necessary".

The client rep and the offshore manager sat and talked about how they could solve it. They made some sketches, puzzled over it, walked around the departments, and after 1 hour and 20 minutes they had a solution. After the initial discussion client rep then went to the project engineer and proposed the solution. The engineer considered the technical aspects and performed detailed calculations to make sure it was feasible. Then the client rep and the engineer went to the tower crane operator and modified the solution, and finally took it to the offshore manager for approval. When that was granted, the engineer worked out a task plan for the operation. From the time they started working on the idea until the guidepost lay on the deck took 8 hours.

Interview Guide:

- Have you seen anything like this – is the sequence of events realistic?
- What are your reactions to the way the client rep is thinking in this case? (Pros and cons)
- In the example, the client rep describes how other individuals compensate for what is "strictly speaking" the shift supervisor's responsibility. What is your reaction to this?
- If the story is realistic, what, in your mind, might prevent the shift supervisor for taking care of the matter himself?

¹⁰ A broken tool.

- Can you imagine a different way of handling it that you would recommend more?
- Have you heard of such an intervention occurring on your vessel or on a different vessel
- If no: Do you believe it might happen?
- Can you describe a different example that this reminds you of?

Appendix 2: Analysis Template¹¹

Analysis STI (stimulus case) Interview

STI Interview: File name

Informant: Informant category and number

Researcher: Name of researcher who did the interview

Analyst: Name of researcher who did the analysis

Date:

Existence	Description	Check	Evaluation		
			+	-	?
Confirmation	I have seen it				
	I have done it				
	It could have happened				
Disconfirmation	I have not seen it				
	I have not done it				
	It could not have happened				

Comments

Stimulus Case #1

1. Confirmation/disconfirmation, and evaluation
2. What is the logic behind the informant's evaluation of the case, including contingencies?
Why: an intervention is necessary
Who: is the appropriate interventionist
3. What does the informant say specifically about the appropriate lines of command in this case and who is the appropriate "owner" of the leadership challenge illustrated?
4. What are the challenges and dilemmas for the role?
5. What are the challenges and dilemmas for the MTS, including balancing flexibility and structure?
6. New themes and additional quotes

Stimulus Case #2

1. Confirmation/disconfirmation, and evaluation

¹¹ After the first test run, the team had decided that the original Case # 4 would not be used. Cases 1,2,3 and 7 were renumbered and used.

2. What is the logic behind the informant's evaluation of the case, including contingencies?
Why: an intervention is necessary
Who: is the appropriate interventionist
3. What does the informant say specifically about the appropriate lines of command in this case and who is the appropriate "owner" of the leadership challenge illustrated?
4. What are the challenges and dilemmas for the role?
5. What are the challenges and dilemmas for the MTS, including balancing flexibility and structure?
6. New themes and additional quotes

Stimulus Case #3

1. Confirmation/disconfirmation, and evaluation
2. What is the logic behind the informant's evaluation of the case, including contingencies?
3. What does the informant say specifically about the appropriate lines of command in this case and who is the appropriate "owner" of the leadership challenge illustrated?
4. What are the challenges and dilemmas for the role?
5. What are the challenges and dilemmas for the MTS, including balancing flexibility and structure?
6. New themes and additional quotes

Stimulus Case #4

1. Confirmation/disconfirmation, and evaluation
2. What is the logic behind the informant's evaluation of the case, including contingencies?
What does the informant say specifically about the appropriate lines of command in this case and who is the appropriate "owner" of the leadership challenge illustrated?
3. What are the challenges and dilemmas for the role?
4. What are the challenges and dilemmas for the MTS, including balancing flexibility and structure?
5. New themes and additional quotes

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Complex and tightly coupled operations, despite having clear command lines and rigorous procedures, may be vulnerable to unexpected events that threaten their operations. To succeed, they need the capacity to respond flexibly and swiftly. In subsea operations, it has been proposed that when disruptive events occur while the formal leader is focused on task coordination, others with sufficient time, competence and standing step in and exercise informal leadership. This leadership redundancy has been described as a managerial resource that provides critical organizational slack. The present paper describes a methodology to test the leadership redundancy hypothesis, and summarizes preliminary findings.