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Professional culture, work practice and reliable operations in shipping

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ABSTRACT: This paper discusses the relationship between *preferred* and *actual* work practice for the officers in the shipping industry. While officers seem to be familiar with the preferred work practice given in steering documentation, training manuals, engine manuals and company policy, they sometimes use an alternative work practice in their daily work on board. Examples on this discrepancy are found in our study of a major Norwegian shipping company. We suggest in this paper to see this deviation in the work practice among officers relation to their professional culture. We propose distance and development of subcultures together with silent deviations and tacit knowledge as explanations of leading to drifting to a mismatch between procedures and actual behavior.

1 INTRODUCTION

While everybody might agree that safe and reliable operation of a merchant ship is the key responsibility of the ship's officers, exactly how this ought to be carried out remains an open question. The aim of this paper is to understand and discuss the relationship between *preferred* and *actual* work practices for officers in the shipping industry.

The preferred work practice in a shipping company is to a large degree defined by the onshore organization. Through formal training, manuals, and instructions, as well as daily communication with the onshore organization (superintendents, fleet managers, and technical departments), the officers on board are met with a wide range of expectations and instructions of how to safely and reliably manage and operate the vessel. The shipping companies thus aim to communicate their operation policy and to ensure that the best practice is adopted and that this is standardized across the fleet. Moreover, through formal technical training the officers are introduced to the best reliable practice, according to, for instance, the auxiliary and main engine manufacturers. As the findings and discussion section below will show, this preferred work practice, i.e. company policy, is well known among the officers covered in this study.

However, in the same section we shall see that actual operation, the real work practice on board, differs from the ideal performance communicated from onshore in certain key areas. While officers often are familiar with company policy and engine manufacturers' instructions, they choose to rely on an alternative work practice. This leaves us with some central questions: Why do skilled officers choose to solve their working tasks in a manner that deviates from existing instructions? In theory, they are aware of the instructions for best practice, but instead choose to follow local practices. Why is that?

Before we move on to comment and discuss these questions, we account for some theoretical considerations on the existence and derivation of a gap between actual practices and written procedures, i.e. preferred work practice. As observe that deviating work practices are a well-known phenomenon in many sectors and industries, and thus a recurring theme in organizational and safety studies.

2 PROFESSIONALS AND WORK PRACTICES

Every profession develops a set of norms, values, and attitudes that, together with knowledge and experience, influences work practice. This has been described as professional culture, found for instance in aviation or medicine (Helmreich & Merritt 1998). The professional culture may be expressed as part of an organizational culture or may be related to different subcultures in an organization. Schein (2004) has defined the culture of a group as a pattern of shared basic assumptions, learned by the group as it solved its problems of external adaptation and internal integration. It has worked well enough to be considered valid, and the assumptions come to be taken for granted, determining much of the behavior in the

group. The rules and norms of the group are taught to new members in a socialization process.

The following discusses how a group is influenced by different factors and point to different explanations as to why a work practice onboard a vessel may come to move away from formal procedures established by the parent organization.

2.1 *Drifting and tacit knowledge*

"Silent Deviations" is a term used by several companies in the oil and gas industry to describe the mismatch between procedures and actual work practices (Tinmannsvik 2008). It points to a constant conflict between getting the job done and compliance with procedures and is an expression of how routine violations of written procedures tacitly become accepted practice. Reason (1997) uses the term "necessary violations", where operators find a balance between procedures and knowledge based problem solving in order to minimize workload.

We can compare this to the perspective of Argyris & Schön (1996) about organizational theory-in-use and espoused theory. They argue that organizational theories-in-use may be tacit rather that explicit and may not match the espoused theory found in the organization's formal documents, e.g. job descriptions or organizational charts. The organizational theories-in-use may remain tacit, as they are indescribable by the actors who use them or not up for discussion, because the topic may be perceived as threatening or embarrassing.

Silent deviations may contribute to what Snook (2000) refers to as "practical drift", where pragmatic practices loosen the grip of even the most rational and well-designed formal procedures. He argues that *"Over time, globally designed but locally impractical procedures lose out to practical action when no one complains. Gradually, locally efficient behavior becomes accepted practice"* (Snook 2000:185). The loose coupling between ship crews and the rest of the organization means that ships are isolated communities. This may contribute to a slow, but steady, uncoupling of local practice from written procedures. Local adjustments to a procedure are hardly ever discussed in organizations, in part because this practice is embodied and perceived as "the way we do things around here". Local practice is part of the culture and part of the tacit knowledge. Deviation from formal procedures gradually evolves and becomes a habit, resulting in a gradual drift out of control, where incorrect job methods become common practice. Under normal conditions this contributes to a more efficient organization, but when actual practices differ from written procedures it may lead to several challenges in an organization.

Vaughan (1996) introduced the concept of "normalization to deviance" in her analysis of the space shuttle "Challenger" disaster in 1986. She showed how people who work together develop work patterns that make them blind to the consequences of their actions. Small changes in their behavior gradually become the norm and accepted practice. No rules are formally violated, but the consequence is silent acceptance of an existing danger in an organization.

Vaughan (1996) identifies three social forces that contribute to normalization of deviance; two are related to cultural aspects, and the third is described as "structural secrecy". She claims that secrecy is built into the structure of an organization and says: *"As organizations grow large, actions are, for the most part not observable. The division of labor between subunits, hierarchy, and geographically dispersion segregate knowledge about tasks and goals. Distance – both physical and social – interferes with the efforts of those at the top "know" the behavior of others in the organization – and vice versa. Specialized knowledge further inhibits knowing. People in one department or division lack the expertise to understand the work in another, or for that matter, the work of other specialists in their own unit"* (Vaughan 1996:250).

Bourrier (1998) discusses the procedures related to maintenance in nuclear power plants. She describes how maintenance personnel would fail to complete their assigned tasks if they did not bypass the rules in order to handle non-planned or unexpected situations. When the employees are given the resources and the authority to adjust the rules according to experience and changes in working conditions, and the procedures are formalized and supported by the employees, she refers to the organization as self-correcting. This is contrasted with organizations where practice has become individualized, where the wisdom is private or opaque, gradually leading to inaccurate procedures (Bourrier 2005).

3 METHOD

This paper is based on a quantitative survey, interviews, and fieldwork in a major Norwegian shipping company. Data was collected in 2008–2009 and consists of survey data from 112 Filipino officers, as well as observations and structured and semi-structured interviews carried out during visits on board.

The survey was sent to each vessel in the shipping company by e-mail and distributed to the respondents in question. The completed questionnaires were returned by express mail. The managerial positions covered in the survey were: Master, Chief Mate, Chief Engineer, First Engineer, Second Engineer, Second Mate, and Third Mate. The total response rate was 70 percent.

The findings in the survey has on several occasions been presented and discussed with members of the onshore staff in the shipping company. Both managers and members from the technical, health and safety, and training departments have been taking part in these discussions. We see this exchange of experience as an important quality assurance and validation of the survey results.

Table 1. Frequency distribution for questions regarding work practice – *"It is good operational practice to follow manuals and instructions provided by the engine manufacturer in running".*

	Strongly disagree/ disagree	Neither/ nor	Agree/ strongly agree
Main engines	–	–	100 %
Auxiliary engines	–	–	100 %
Cylinder lubrication oil	–	1%	99 %

Table 2. Frequency distribution for questions regarding experience transfer – *"It is good operational practice to follow routines and procedures established by my predecessor/colleagues regarding operation/ maintenance of".*

	Strongly disagree/ disagree	Neither/ nor	Agree/ strongly agree
Main engines	18 %	11%	71%
Auxiliary engines	26%	16%	58%
Cylinder lubrication oil	34%	15%	51%

The survey focused on good operational practices in shipping and communication between land and sea. The questions and scales were designed specifically for this study and covered the following topics: 1) background and experience, 2) best operational practice, 3) operations and technical issues, 4) health, environment and safety, and 5) communication and management. The data was analyzed using SPSS version 16.0 and a frequency analysis was carried out on some of the issues listed above. The following section presents and discusses the empirical findings. Survey data is key, but interviews and fieldwork from several visits on board also help shed light on the gap between preferred and actual work practices among the officers.

4 FINDINGS AND DISCUSSION

In other situations, there may be several different ways to actually conduct technical operations. However, in this case the ideal technical operational practice is a given entity. From company policy on technical issues, and through formal training on auxiliary and main engines provided by the engine manufacturers, the officers are introduced to standard operating procedures (SOP) and best practice on how to operate the ship.

As demonstrated in table 1, the officers themselves know the best and acceptable reliable practice.

Virtually all the officers agree or strongly agree to the question "It is good operational practice to follow manuals and instructions provided by the engine manufacturer in running the main engine, auxiliary engine, and cylinder lubrication oil." Phrased differently, when presented with a statement that emphasizes the importance of written manuals and instruction when their aim is to carry out good operational practice, it is met by full recognition by the officers.

However, Table 1 juxtaposed with Table 2 reveals an interesting gap in what influences the officers' actual work performance. Whereas table 1 provides an outline of what they ought to do, table 2 to a larger degree indicates what they actually do.

In Table 2 we see that a majority of the officers agree or strongly agree that "It is good operational practice to follow routines and procedures established by my predecessor/colleagues" rather than written instructions. As many as 71 percent regard the work performance of their predecessor and/or colleague as good operational practice when it comes to the operation/maintenance of the main engine, while the corresponding figures for the auxiliary engine and the consumption of lubrication oil is 58 percent and 51 percent.

The gap between preferred and actual work practice, indicated by Tables 1 and 2, prompts some questions: Why do the skilled Filipino officers, who know, in theory, the instructions for best practice, choose to solve their work tasks in a deviating manner? What is the plausible explanation for this operational variation?

Insufficient knowledge can obviously form part of the explanation for such a divergence. Some of the findings in the survey do suggest that a few officers clearly need more in-depth knowledge on certain topics, such as the consumption of cylinder lubrication oil. For example as many as 24 percent agree or strongly agree that "It is good operational practice to use more cylinder lubrication oil on the engines than specified, to reduce wear." This statement describes a work practice that is, according to technical experts onshore, wrong and dysfunctional. When using more lubrication oil than specified, it only increases the wear on the engine, thus leading to more maintenance, rather than the opposite. It should be emphasized, however, that the majority of officers disagreed with this statement and shared the opinion of the onshore experts.

Although a lack of know-how among officers may be an explanatory element in this picture, we need to look elsewhere for inducement factors when the aim is to understand the variation between preferred and actual work practices.

4.1 *Professional culture*

In this paper we maintain that the work practice among officers should be seen in relation to a group culture among seafarers, comparable to the professional cultures described by Helmreich and Merrit (1998) in professional fields, such as aviation and medicine. We argue that implicit in this occupational ethos is a strong emphasis on troubleshooting as a necessary, expected, and highly appreciated value. By the term troubleshooting we mean good in solving current

problems involved in ship operations. The fact that a vessel could be considered as an isolated community or subculture, which, in turn, paves the way for the development of local work practices, is part of this picture as well. The following discussion and tables (Tables 3 and 4) outlines the findings from the survey that emphasize isolation as a backdrop *for* and troubleshooting as an apparent part *of* the professional culture onboard the ship.

4.2 *Distance and the development of subcultures*

A shipping company can be described as a series of subcultures. It should be denoted as a highly distributed organization. An international shipping company consists of a chain of floating work communities, operating in international waters across different time zones. They are involved in a variety of trades and are often manned by multinational crews. These features challenge the idea of standardized routines and uniformed work practices. A lack of understanding of the work situations onboard other vessels can also be added to this picture. The officers have emphasized how staff members in the onshore organization lack a deep understanding of how everyday life onboard is like.

The seafarers' experience of a profound distance – propelled by the nature of their work situation and a geographic distance – may give rise to a notion of an "us" vs. "them" Mentality. With this in mind, it should be feasible to understand the origin of local and deviating work practices. Seen from this angle, the vessel can be portrayed as a self-contained work community, manned by skilled professionals that know best how to run and operate their ship. According to the seafarers, members of the onshore staff are not on board and are therefore not able to obtain hands-on experience and knowledge for how to solve the variety of daily work task on board.

Some of the findings in the survey indicate that the officers in general are fairly content with the onshore-onboard communication. For example as many as 91 percent agree or strongly agree that "In general, we are satisfied with the present situation regarding the communication between the onshore organization and the ship." Also, the officers' view of the collaboration with the superintendent – the key position in a shipping company when it comes to ship to shore communication – illustrates a positive attitude towards the communication with the onshore organization. As many as 99 percent of the officers agree or strongly agree that the "superintendents and officers have a common understanding of good operational practice," while 74 percent want "the superintendent [to] visit the ship more frequently."

In table 3 we see some indications of how the officers on board experience the attention from the onshore organization on certain aspects of their daily work on board.

As indicated in Table 3, some of the attention from the onshore organization is experienced as being somewhat annoying or slightly "too much" by the officers on board. The table shows that 75–94 percent feel that the onshore organization pays too much attention to issues like part-load, consumption of cylinder lubrication oil, documentation, consumption of spare parts, and environmental concerns. One possible way to interpret these answers is to view them as an expression of a discourse between the land organization and the officers on board, on what is critical and what characterizes good operational practice. The fact that the vast majority of the officers find the attention from onshore staff to be exaggerated and perhaps irrelevant for what they experience as critical and important in their daily work, suggests such a conflict of interest between the vessel and the land organization. While the onshore departments focus on their specific segment of operations on board – emphasizing their set Key Performance Indicators (KPIs) – the officers on board tend to have a more holistic approach towards ship operations.

Table 3. Frequency distribution for questions regarding land/sea communication.

	Strongly disagree/ disagree	Neither/ nor	Agree/ strongly agree
There is too much attention from the land side on the part-load issue	11%	12%	77%
There is too much attention from land organization on the consumption of cylinder lubrication oil	11%	12%	77%
There is too much attention on documenting maintenance for management onshore	12%	12%	76%
The onshore organization pays too much attention to our consumption of spare parts	15%	10%	75%
Attention to environmental issues is too high	4%	2%	94%

This approach is also strengthened by the interviews conducted in this project. Several informants in different ways expressed how the land organization is too preoccupied with certain isolated aspects of work performance on board, and not sufficiently concerned with taking the overall performance into account.

Take, for example, the consumption of cylinder lubrication oil. Many onshore staff members, especially representatives from the technical departments, see this as *the* KPI for quality when it comes to how engines are operated on board, in the sense that the amount of cylinder lubrication oil consumed on board

says something general about the technical condition and the quality of the work routines on board. For the officers, however, the consumption of cylinder lubrication oil is only one indicator, only one aspect of the daily operation to which they need to pay attention. As seen in Table 3, as many as 77 percent claim that "There is too much attention from land organization on the consumption of cylinder lubrication oil."

It seems like the officers on board need to take a more holistic approach to their daily work – they need to consider a long range of critical factors and parameters – whereas different departments onshore can afford the "luxury" of focusing only on *their* segment or *their* version of good operational practice and thus communicate the importance of this field to the onboard management.

4.3 *Improvisation and troubleshooting*

So far, we have seen the experience of distance – in a broad sense of the word – as an important explanatory factor in the origin of a deviating work practice on board. If we also ad troubleshooting as a necessary, expected, and highly appreciated value in this profession, the idea of linking the deviation in work practice to the professional culture held by the seafarers is strengthened.

We maintain that being good at fixing current problems involved in ship operation is a value held in high esteem in a maritime career. Phrased differently, in order to gain respect as a seafarer it is important to be hard working and to show personal initiative in everyday life on board. Masculinity is also a part of this picture, in the sense that being able to solve problems on board as they emerge, corresponds with the image of being a real man in this profession. Furthermore, being capable of troubleshooting must also be considered a necessity in this industry. In fact, the vessels are often cut off from land-based assistance and must thus, to a relatively large degree, be self-contained with services on board. Being capable of finding good solutions to professional problems is also expected, often silently, from the onshore organization.

The seafarers on board often talk about the flow of new tasks that keep being imposed on the staff on board. Reporting and documentations issues, paperwork, in short, are one example of an area in which they face an increase in the workload on board. As many as 90 percent of the officers agree or strongly agree that "The amount of time spent on reporting/paperwork is increasing." (For a further discussion of the implications of paperwork on the working situation of managers, see for example Lamvik, G., Bye, R. & Torvatn, H., 2008 and Lamvik *et al.*, 2009).

In table 4 we see examples of how the officers view their onboard work practice.

As the table shows, a majority of the seafarers find the term improvisation to be suitable for describing their work performance on board. 79 percent of the officers agree or strongly agree that the "Ability to improvise is important for good operational practice" and 78 percent claim that "Our crew is good at quick fixes and improvisation."

Table 4. Frequency distribution for questions regarding improvisation and troubleshooting.

Disagree	Strongly disagree/ nor	Neither/ agree	Agree/ strongly
Ability to improvise is important for good operational practice	10%	11%	79%
Our crew is good at quick fixes and improvisation	13%	9%	78%
Maintenance should as, far as possible, be performed by own crew	19%	7%	73%
The work pace is so in-tense that we have to "cut corners" to get the job done quickly enough	78%	11%	11%

The fact that almost eight out of ten underline "quick fixes" as a positive quality in their work practice is a rather surprising finding. While the term often is associated with short cuts and short-term solutions in a Western setting, the term obviously contains other and more positive connotations when interpreted and understood in a Philippine context. It appears Filipino seafarers hold it as being synonymous with improvisation and troubleshooting. (For further discussion of cultural differences and work practices, see for example Lamvik, 2002 and Lamvik and Bye, 2004). But the troubleshooting on board does have its limits, however. Despite the strong position of an improvisational practice, it does not seem to generate a "cutting corners" culture on board. Only 11 percent of the officers agreed or strongly agreed that "The work pace is so intense that we have to "cut corners" to get the job done quickly enough," and 78 percent disagreed with this statement.

The table is also indicative of the officers' ability and willingness to be self-contained on board. As many as 73 percent of the respondents insist that "Maintenance should, as far as possible, be performed by own crew."

5 CONCLUSION

In this paper we have argued that the deviation in work practices among officers in a major Norwegian shipping company must be seen in relation to their professional culture. In that sense, an onboard deviating practice is one way to act in accordance with occupational values in this maritime profession. We have further on asserted that the variations in how work is performed on board – compared to what is expected

from the onshore organization – should be linked to the experience of distance and the development of a subcultural universe on board, as well as to the fact that troubleshooting is a necessary, expected, and highly appreciated value in this profession.

The examples of discrepancies between preferred and actual work practices indicated in this study may not serious in and of themselves. For example, exceeding the optimal – which is the specification provided by the engine manufacturer – consumption of cylinder lubrication oil may not in itself be a problem that needs immediate handling. However, by drifting away from formal procedures, the situation may eventually lead to a large gap between what is assumed practice and what is actual behavior, which, in turn, can escalate the problem. This is exemplified both by "normalization of deviance", as described by Vaughan (1996) and "practical drift," as found in the perspective given by Snook (2000). Silent deviations (Tinmannsvik 2008) reinforce the gap and generates opaque wisdom (Bourrier 2005), making tacit knowledge an important contributing factor to the mismatch between preferred and actual work practice.

Bourrier (2005, 1998) suggests that a possible solution may be found in giving the operative personnel the resources and the authority to adjust the formal procedures according to experience and local practice. Allowing discussion about a company's operation policy may also make the tacit knowledge more tangible and individualized practices may be avoided.

We are certain that a work practice characterized by a lack of corrective action and silent deviation eventually will lead to more severe operational problems. It is thus necessary to establish a common practice among seafarers to carry out individual analyses and make conscious decisions as how one should operate, so that one can objectively consider whether the routines established by a predecessor is in fact the best practice according to formal procedures and local know-how.

REFERENCES

Argyris, C. & Schön, D. A. 1996. *Organizational learning II, Theory, Method and Practice.* USA: Addison-Wesley Publishing Company.

Bourrier, M. 1998. Elements for designing a self-correcting organization: Examples from nuclear power plants. In Hale, A. & Baram, M.S. (eds) *Safety Management. The challenge of change*, Oxford: Pergamon.

Bourrier, M. 2005. The Contribution of Organizational Design to Safety. *European Management Journal* 23 (1): 98–104.

Helmreich, R.L. & Merritt, A.C. 1998. *Culture at Work in Aviation and Medicine.* Aldershot: Ashgate.

Janis, I. 1982. *Groupthink.* Boston: Houghton Mifflin.

Lamvik, G.M., Næsje, P.C,, Skarholt, K. & Torvatn, H. 2009. Paperwork, management, and safety: Towards a bureaucratization of working life and a lack of hands-on supervision. In *Safety, Reliability and Risk Analysis: Theory, Method and Applications.* Martoell et.al, (eds). London: Taylor and Francis Group.

Lamvik, G,M., Bye, R. & Torvatn, H. 2008. *Safety management and "paperwork" – Offshore managers, reporting practice and HSE.* Paper for the PSAM 09 conference, Hong Kong May 2008.

Lamvik GM & Bye R. 2004. National culture and safe work practice—a comparison between Filipinos and Norwegian seafaring professionals. In: Spitzer C, Schmocker V, Dang V.N., (eds). *Probabilistic safety assessment and management,* vol. 3. London: Springer.

Lamvik G.M. 2002. *The Filipino Seafarer – a life between sacrifice and shopping.* PhD thesis. Trondheim: Norwegian University of Science and Technology.

Reason, J. 1997. *Managing the risks of organizational accidents.* Aldershot: Ashgate.

Schein, E. 2004. *Organizational culture and leadership.* San Francisco: Jossey-Bass.

Snook, S.A. 2000. *Friendly Fire.* New Jersey: Princeton University Press.

Tinmannsvik, R.K. 2008. "Stille Avvik" – trussel eller mulighet? In Tinmannsvik R.K. (ed) *Robust arbeidspraksis:* 133–146. Trondheim: Tapir Akademiske Forlag.

Vaughan, D. 1996. *The Challenger launch decision.* Chicago: The University of Chicago Press.