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The nature and management of crises in construction projects: Projects-as-practice observations

Markus Hällgren *, Timothy L. Wilson

Umeå School of Business, Umeå University, S901 87 Umeå, Sweden

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Abstract

The uniqueness of projects introduces aspects of management associated with disruptions that threaten progress and crises that affect the organisations that conduct them. The purpose of this paper thus is to review the nature of crises and their remedies that have interfered with project progress of an international construction company. Fifteen crises were studied in a “projects-as-practice” approach. Characterisation was made of both the nature of these crises and how they were managed.

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1. Introduction

Management of projects carries a certain allure for individuals who shun routine, work-a-day life styles. The uncertainty associated with producing unique outputs implies that each day can bring new experiences. In this regard, Pavlak [1], for instance, discussed the fire fighting aspects of management associated with disruptions that threaten projects and crises that affect organisations. Recently, Hällgren and Wilson [2] reported on project deviations, i.e., any incident that effectively delayed project tasks, their nature and remedy.

Although the classical treatment of projects suggests that they can be well-planned in advance cf. [3], there is plenty of room for unanticipated events to interfere with plans. In some cases, these events seem not to matter and thus are tolerated. The Sydney opera house comes to mind; it came in 10 years late and about 1500 percent over budget cf. [4], but is considered an architectural achievement and perhaps a wonder of the modern world. On the other hand,

projects are frequently bid on a fixed-time, fixed-cost basis. Thus, unanticipated events may quickly rise to the level of crises if they happen to lie on the critical path that determines the time for completion. Someone pays for overruns – either it is absorbed by the contractor, or is paid by the funding organisation as an overrun. To put things in perspective, the cost of infrastructural projects can be of the order of one billion euros, conducted over a three-year time span. Thus, a one-day delay represents a cost to someone of one million euros. To paraphrase a former US senator, “a million here, a million there and pretty soon you are talking real money”.¹

As suggested by Mallak and Kurstedt [5], crises seem inevitable in projects. Consequently, companies that deal in projects on an ongoing basis thus must learn to deal with crises on a regular basis. It is these crises that are the concern of this paper. Its specific purpose therefore is to review the nature of critical interruptions that have interfered with project progress of an international construction company and reflect upon their remedies. It is thought that this exposure will add to the projects-as-practice material for academics and

* Corresponding author. Tel.: +46 90 786 77 30.

E-mail addresses: Markus.hallgren@usbe.umu.se (M. Hällgren), tim.wilson@usbe.umu.se (T.L. Wilson).

URL: <http://www.markushallgren.com> (M. Hällgren).

¹ The essence of this quotation is attributed to Everett Dirksen, former senator from Illinois (en.wikipedia.org/wiki/Everett_Dirksen. Downloaded 26 January 2007).

the normative literature that assists managers in dealing with crises, especially within construction organisations. The construction industry was selected for study because of its exposure. That is, virtually everyone can identify with its outputs and its tenure; basic, state construction historically dates to the pyramids cf. [3,6]. Its understanding is thus fundamental to understanding crises in projects.

2. Background

2.1. Crises

Because they occur across industries, much of the information on crises and their responses tend to be general cf. [5,7–9,11]. Regardless of the approach, however, there are certain things that appear common to industrial crises conceptualisation. They include an assumption of primarily singular events that have the propensity to impart significant injury to the company. Fundamentally, the observation is made that complex organisations somewhere along the line will experience unimaginable events that destabilise the organisation cf. [8]. There is also agreement that tightly coupled systems appear to be particularly susceptible to a cascade of failures, e.g., crises [9–11]. For instance, Hensgen et al. [12] use the operational definition of a crisis “those internal and/or external events that cause stress on organisational resources and pose the greatest threats on any organisation’s security and vitality”. Reid [13], largely in agreement, has surveyed the literature from a practitioner/consultant’s viewpoint and developed the following concept of a crisis – as any incident that can focus negative attention on a company and have an adverse effect on its overall financial condition, its relationships with its audiences, or its reputation in the marketplace (p. 2).

It should be noted from these definitions – one from an academic standpoint, the other more practice oriented, crises are associated with consequences. Nothing is said about magnitude as a criterion. That is, it does not take a tsunami, an earthquake, a fire, or a death on site to precipitate a crisis. They may be associated with disasters, but not necessarily so. They are any event or incident that poses a threat to an organisation’s security or has an adverse effect on financial conditions, relationships, or reputation in the marketplace. Further, Hwang and Lichtenthal [7] have indicated crises do not necessarily have to be associated with a specific event. They identify two types of crises – abrupt crises that strike suddenly and catch management off-guard versus cumulative crises (their words) that accumulate stressors and eventually erupt. Likewise, Roux-Dufort [14] allows for a type of crisis that is a process of accumulation of deficiencies and weaknesses rather than as a sudden and extraordinary irruption.

2.2. Crises in construction projects

There are enumerable incidents that can interrupt progress in construction projects. Hällgren and Wilson [2],

for instance, made a study of deviations (their term) in construction projects. Not all deviations, however, are crises. Deviations along the non-critical path for example are handled by using some of the slack available that makes the task non-critical. It is only when the deviation occurs along the critical path, or when it extends the timing of a non-critical task to make it critical, does a crisis occur. It would appear that a relatively high incidence of these crises is possible in the industry. Although firms in the industry have been described as loosely coupled systems [15], which would suggest resistance to the “cascades of failures” [9] associated with tightly coupled systems, crises still occur – the consequence of planning introduces tight coupling in activities.

Loosemore [16–18] has conducted case studies that focused on behaviour during the crisis period. Within these case studies, he observed both sudden and creeping crises (his terms), which could be expected from the above [7]. Essentially he found that response was shaped by the nature of the crisis, and emotions commonly ran the gamut from initial feelings of helplessness to final feelings of cooperation and confidence – one case, however, generated just the opposite feelings. He thus was reluctant to propose one generic theory of management because such an approach would oversimplify the process. It was ironic that at a time when effective communication was important, it was found less likely and at a time when responsibility and teamwork were important, they were also less likely.

Reid [13] approached crises in the industry from a more normative standpoint and suggested two lessons might be learned: first, because of the human element involved, no one is immune to the inevitable. Second, crises do not discriminate – small companies or large, specialised or general, each will see their potential demise at some point. By being prepared, however, at least there is a support system for employees even though there is no one size-fits-all protocol (p. xiv). That is, crises came from a variety of sources. In the US, on-site accidents were the most common source of crisis in the industry. Surprisingly, fatalities were down the list at number 5; sexual harassment and work stoppages rounded out the list. In dealing with the rhetorical question, “Can one prevent crises”? The author was of the opinion that “in the large majority of cases, the answer is an unqualified yes merely by applying an increased awareness. The only exception might be a natural disaster. . . In man-made crises, a warning bell typically is sounded, but it usually falls upon deaf ears” [13, p. 8].

2.3. Dealing with crises

Basically, the literature suggests there are two viable options in dealing with crises. The first and preferred, of course, is to prevent them. Reid [13] and others suggest prevention in part is possible [1]. Lagadec [8], on the other hand, defined crises as being unimaginable, and thus one would think impossible to prevent; it has been suggested in fact that crises in projects are inevitable [5]. Regardless

of the case, preparation for unexpected possibilities provides the second option. That is, all crises cannot be foreseen, and so prudent steps are taken to deal with their occurrence. In Reid's [13] case a crisis management plan and response team was suggested, along with some exercises that could be done in preparation. Mallak and Kurstedt [5] have suggested risk analysis, contingency plans, logic charts and table top exercises as tools useful in preparing for crises. Under girding these approaches are organisations that are not too elegant or specialised [9] and a system that provides communication of initial events as early as possible [9,12,16].

Team responses to crisis management are commonly cited as useful. Engwall and Svenson [19] identified three team formations associated with problems arising in projects – project teams themselves, tiger teams and cheetah teams. These teams can be distinguished on the basis of (1) sanction, (2) mission specificity, (3) permanence, (4) membership commitment and (5) advance planning. Cases have been made for both the utility of tiger teams [1] and cheetah teams [19,20] as being useful in crises situations.

2.4. *Projects-as-practice*

Because crises tend to be extraordinary and situational, actual practice such as team formation would appear relevant. In that regard, over the last few years Drucker's [21, p. viii] words, "What constitutes knowledge in practice is largely defined by the ends, that is, by the practice" have received increasing appreciation through the interest in micro-activities in the research on organisations. Schatzki et al. [22] called the development "The Practice Turn". Taking a practice perspective means taking the actions of the practitioners seriously. It means treating projects as something people do rather than a structure that is [23,24]. The practice perspective extends both beyond the common understanding of projects into activities within projects and project work and as a phenomenon beyond the walls of the single organisation cf. [25, p. 614]. Doing so, the project-as-practice perspective is complementary, but not substituting for, the commonly recognised normative and process related perspectives on projects [26]. Nevertheless, rather than focusing on success factors and anticipated efficiency, the practice perspective is interested in the actions of the practitioners [27]. Transferred to research on crises, a practice perspective focuses on what practitioners do in the resolution of crises and which practices they draw upon when doing so.

3. Methodology

The practice turn calls for careful methodological considerations. As Geertz [28, p. 6] put it (transferred to projects), "If you want to understand what project management is, you should first look into what the practitioners do". Loosemore [16] in turn suggested that a case study approach can be effective in understanding the role

of crises and crisis management in project organisations. In this study, a multiple case approach was used in which cases were followed in the experiences of distributed power plant projects developed by an integrated provider of projects of this type. These observations were in line with the classic ethnographic studies of Mintzberg [29] and Carlson [30] and the stream of ethnographic studies associated with contemporary practice research cf. [22–24,27], which have gained appreciation for producing knowledge based on actual practice in everyday operations.

All the information in the general study of course did not relate to crises, which represented a small fraction of observations. The larger portion of the study was on the practice of managing deviations, i.e., when something unexpected occurred and how such a situation was remedied [32]. Within this implementation, deviations from policy and plans occurred [32]. That is, unforeseen interruptions affected progress. If these deviations occurred along the non-critical path of the project plan, they posed as crises only if response to them shifted the path from non-critical to critical. Interruptions on the critical path, of course, posed as crises immediately. The "call" on whether a deviation was a crisis or not thus depended upon its location in the project plan, i.e., was it on the critical path or not? That call invariably was made by the project manager who worked at the corporate office, and it represented the first level of coding required to permit systematic analysis of qualitative data cf. [31].²

In the majority of instances (13/15),³ crises in projects were observed during a total of 10 weeks of on-site visits for each project. A range of ancillary methods supported observations. Informal conversations with project principals were noted and recorded in a diary of observations. In this way, the diary provided notes on team conversations as well as those conducted with onlookers. There was full access to the database of plans, emails and reports. Previous agreement gave access to phone calls and other records for the specific periods in which the deviations occurred. Subsequently, sixty, formal, semi-structured

² Miles [31] recognized the problem of doing justice to a vast amount of qualitative material. Later Eisenhardt and Graebner [33] dealt with the same issue. They suggested that the issue should be managed by just theory building, thorough sampling of cases, pattern match theory and data, in addition to presenting the observations and results with tables. This issue applies to the broader application of our research. Here, we have dealt with the issue by providing the coding as Miles suggested and also attempted to provide sound theoretical arguments on crises as suggested by Eisenhardt and Graebner so that crises cases could be chosen that provide the optimal information on such situations. By using a multi-case approach we have sacrificed some empirical depth but on the other hand as Eisenhardt and Graebner noted "tables and other visual devices are central to signalling the depth and detail of empirical grounding" in multi-case research. In this paper we have the two tables and the figure that comply with this recommendation.

³ Two of the crises were common knowledge in the corporation and these details were determined by separate interviews. They are included here because their elements appeared to coincide with observations in the other 13 crises.

		Crises	
		Abrupt	Cumulative
Organisation	Project Overseers plus Site Team	Q1 7, 8, 9	Q2 10, 12, 14, 15
	Corporation Staff	Q3 1, 2, 3, 5, 11	Q4 4, 6, 13

Fig. 1. Hwang and Lichtenthal crises anatomy [7] adapted to the project management situation.

interviews among participants ranging between 30 min and 2 h were conducted and tape-recorded [2, 32]. From this information, the crises could be coded abrupt or cumulative (Hwang and Lichtenthal terms) and then who was instrumental in handling them – project overseers plus site team, or corporate staff. Team characteristics were determined by whether the team was formally recognized as a group and set up to handle a situation as an extraordinary task over a period of time, which defined the formal groups. Informal groups, on the other hand, handled the crises within the work-a-day responsibilities and were not recognised as formal groups, but collections of individuals contributing their resources to end solutions [cf. 9]. The results of this coding approach are reflected in Fig. 1. The cases, briefly described in Tables 1 and 2, were assembled from this information. The stage in the project life cycle came from actual timing of the crises divided by time to complete the project (actual or expected).

4. Observations

4.1. General observations

The company that was studied was an international firm that focused on construction projects associated with power generation, but also had its own engineering capabilities [32]. Under normal circumstances the company would conduct over 100 projects per year, and the median project size utilised an eight person group as a core, plus sub-contractors, plus consultants and test people. Most importantly for this study, it should be noted that the company utilised elements of a dual structure. That is, a typical project would be organised with a project team consisting of the project manager and three project engineers at the corporate office and a site team consisting of a site manager and engineers situated where the project was being executed. For both the project and the site team there would be additional resources and expertise to utilise. For this, the company maintained in-house legal, human resources and engineering capabil-

ities, and it also outsourced some engineering and logistic services.

4.2. Planning process

The company under study was an adherent to a rigorous planning approach. All plans could be summarised as follows:

- Project execution plan.
- Area of responsibility plans (electrical, mechanical, civil).
 - Time.
 - Design/function.
- Operational plan.
 - Master schedule.
 - Sub-contractors' plan.
 - Working order.
 - Supervisors' plan.

The planning process typically started with a contract negotiated between the company's sales team (with some assistance from the project team) and the client. The contract specified the overall project deadlines and performance guarantees for electrical, heat, steam, oil consumption and emissions. A plan in general would be initiated by a junior engineer assigned that responsibility, but soon turned over to the project manager. The project manager would use his/her experience, counting backwards from the contractual finish date to set the necessary interim dates. He/she would then estimate deadlines for engineering, procurement, logistics, site execution, sub-contracting, and documentation. Included would be implications for project management, site management and final warranty. Situations varied, but from start to finish the project plan would be normally finished in two weeks.

In a typical situation the project execution plan is broken down according to chapters that cover a summary, the organisation and required resources, the timing, budget, risk evaluation, communications, design, logistics, transfer, quality, guaranty, travel and special conditions. The tasks in this plan exist on a concurrent "deadline" level, and it serves as a communication tool between the various in-house services and sub-contractors. In addition to the execution plan there are other plans of various formality and use. Some plans are briefly mentioned in the summary of the execution plan while there are other plans that are more detailed.

It should be noted that one of the chapters in the project execution plan is one on risk management. That is, the company highlighted potential risks and the potential to avoid them. In its words, the following risk management method "is implemented in order to avoid cost and time overruns. It includes maximising the results of positive events and minimising the consequences of neg-

Table 1
Nature of the crises observed in the study

Event	PLC	Utilised resources	Security and viability threat
1 Under-estimate discovery	0.15	Local and corporate sales, line management, project team	Budget deficit and cost absorption
2 Negotiations dilemma	0.15	In-house services (sales and legal), project team, line management	Both cost and schedule completion threatened
3 Non-payment of initial amounts	0.15	Project team, in-house services	Cancellation of project. Corporate profitability, sales credibility
4 Taxation issues	0.20	In-house services (sales and legal), project management	Budget escalation and corporate profitability
5 Essential component non-compliance	0.20	Project team, sub-contractor design team	Delay of entire design, overall delay, customer frustration
6 Factory shutdown	0.40	Project team, site team, human resources	Project schedule delay
7 Engine accident	0.60	Site team, project team, line, logistics, engine manufacturer	Death of sub-contractor, project schedule delay, increased costs
8 Guerrilla attack	0.60	Site team, project team, line, shipping company	Safety of site personnel, increased costs, project schedule delay
9 Transport damages	0.75	Project and site team, in-house services (logistics), sub-contractors (manufacturer, logistics)	Project schedule delay. Period payment associated with delivery
10 Slow sub-contractor compliance	0.75	Project and site team, sub-contractors	Project schedule delay
11 Component non-performance	0.85	In-house services (sales, engineering), sub-contractor, site team, project team	Project schedule delay
12 Client delay	0.90	Site team, project team	Project schedule delay. Final payment jeopardised
13 Unwillingness to accept transfer	0.90	In-house services (sales and legal), project team	Penalty for late transfer and less corporate revenue from plant operations
14 Delay in major installation component-1	0.95	Site team, project team	Project schedule delay. Cost associated with re-mobilisation and guarding the plant
15 Delay in major installation component-2	0.95	Site team, project team	Project schedule delay. Cost associated with re-mobilisation and guarding the plant

ative events". In the project execution plan the risks include "late delivery" and "performance warranties" – which are specified in the contract and where the cost and consequence of the event are known to all parties. With regard to operations in the projects under study, construction related events were documented in the monthly reports. These reports were reactive, describing the event, what had been done and in some cases what would be done in the future.

At the site level, there would be operational plans that determine the coordination of tasks. These operational plans would be closely coordinated to any change in the execution plan (deadlines) which are determined mostly by the project team at corporate office but also together with the site team. The plans at the responsibility level (mechanical, civil and mechanical) are broken down into months, weeks, days and in some occasion's hours.

4.3. The nature of construction crises

The largest single source of crises in this study dealt with contract disputes of one form or another (see Table 1). Nine of the crises studied came from this source – four in concern with clients, three with sub-contractors and two with suppliers. They tended to come early (PLC < 0.2) or late (PLC > 0.75) in the project life cycle. There was one

work stoppage due to a guerrilla attack; three crises came from miscellaneous causes, and one each from a fatality and a transport problem.

In addition to causes of crises, there are two other elements that might be considered with regard to crises in construction projects:

- whether they were abrupt or cumulative as defined by Hwang and Lichtenthal [7] (see Fig. 1), and
- where they occurred in the project life cycle.

In this study, crises were about evenly divided between abrupt (8/15) and cumulative (7/15). To some extent, abrupt crises tended to occur early in the PLC (1–11 in Fig. 1) while cumulative crises occurred later (4–15 in Fig. 1). In general, crises occurred fairly uniformly throughout the project life cycle (Table 1).

4.4. Management of crises

The handling of post crisis operations represents the other dimension of interest in these projects. Fig. 1, in this regard, is drawn somewhat idealistically. That is, a solid line is drawn marking the boundary between "Project Overseers plus Site Team" and "Corporate Staff". In reality, that division is a fuzzy one. The demarcation represents the tendency toward one group or another to take the ini-

Table 2
Remedies in crises situations

Remedy	Team characteristics ^a
1 Discussions within the project team, with line management and corporate sales office. Use of some buffers in the budget. Formal depreciation of the project margin	Formal
2 Face to face negotiations with the sub-contractor by project manager and an engineer. Substantial travelling and extensive e-mail correspondence involved. Project was started and an initial down payment made. If the project were cancelled, a prorated amount would be returned to the company	Informal. Part of in-house service and project team tasks
3 An alternative solution where the client paid an extra amount for the delay. This made it possible to continue other negotiations. If the project were cancelled, the amount would not be returned	Formal. Part of in-house service and project team tasks
4 Legal office researched the use and contacted foreign legal authorities in the matter. Situation finally was remedied through sales who had had a similar project in the area	Informal. Solution found outside of the team
5 Extensive re-work required by sub-contractor. Situation preceded by serious discussions between the sub-contractor and client. A matter of understanding reached as the re-work influenced related parts of the design	Formal
6 Site team worked overtime. Schedule was crunched and activities re-arranged to accommodate delay	Informal. Part of in-house service and project team tasks
7 Pending activities re-planned and rescheduled. New engine ordered, old engine salvaged and repaired	Formal
8 Abrupt site de-mobilisation while the project team contacted a ship owner who could pick up the men off the coast. Client contacted and force majeure claimed	Informal
9 Extent of damage established. New equipment ordered while installing the damaged. When the new equipment arrived the damaged items were replaced, allowing for continuous activities in the project. In addition, activities were re-arranged to limit the consequences. Extensive discussions and negotiations with the logistics sub-contractor about responsibility and reimbursement	Formal. Part of in-house service and project team tasks
10 Re-organisation of sub-contractor activities. Continuous negotiations ensued	Informal. Part of in-house service and project team tasks
11 Explained to the customer that the problem was that the transformer would not behave according to specifications as long as they could not transmit the power for which it was designed. This explanation included formal letters and discussions	Formal
12 Re-planning of future activities	Informal
13 Helped the customer save face while attending tasks that could be done but still within the time limit. When enough time had passed the client could not argue for a further delay	Informal
14 Overtime work initiated. Finish date renegotiated	Formal. Part of project and site team tasks
15 Overtime work initiated. Finish date renegotiated	Formal. Part of project and site team tasks

^a In each case the teams were temporary teams set up to accomplish a specific mission and were dissolved after the mission was completed. Members were not assigned to them full time and they were not planned.

tial action. Further, it would be a rare instance indeed if the project manager were not active in all decisions with regard to the project.

Observation in the sample of projects, suggest that corporate staff were involved in handling all the early crises (1–6) whether they were abrupt or cumulative (Fig. 1). Basically, these situations developed just as the projects were getting started ($PLC < 0.4$). In special instances later (11 and 13), they were also active. These situations could also be appreciated because they related to some especially sensitive situations involving the customer. Otherwise, the site team plus the corporate project overseers “owned” the situation.

Two degrees of formality were used in the organisation of groups to handle the crises – a formal recognition of activities and participation, and an informal one (see Table 2). The actual split was about even (formal 8/15; informal 7/15). There was an indication that formally recognised groups were associated in handling abrupt crises (6/8); informal ones with cumulative crises (5/7).⁴ Put another way, in those situations where a crisis became suddenly

apparent, a group would be formed to specifically handle the situation; on the other hand, crises that crept into operations were handled informally within the framework of ongoing activities. In all situations dealt with here, these groups had a specific mission, were dissolved after the task was completed, were not planned in advance, nor were members assigned full time to the task – they had other work to do also.

Four examples (one from each quadrant of Fig. 1) will serve to illustrate the observations of projects as they are practiced.

In the case of the transport damages (9-Q1) the site team discovered that some equipment was damaged in transit. The project manager was immediately contacted; he, in turn, gave the word to the line management. The equipment damage threatened to delay the nine month long project by three months, thus causing a major cost and schedule overrun. The communication between the site, project and line management continued expeditiously, constantly adding information about the extent of the damage, whether it was repairable and how it could be replaced. Within a day the logistics company and the insurance company became involved. At the site, activities were re-

⁴ These results are statistically significant at the 0.075 level in a chi-square test.

arranged; the damaged equipment was used as dummy pieces in the project so that it could go on. Later they would be replaced with the new equipment, thus allowing the site team to continue with operations even though the inattention would have stopped the entire operation. The management of the crisis was first of all focused on finding the solution, then on finding why it had occurred and last on reporting the incident. In the end, equipment was scheduled to be shipped to the site in time for expeditious completion as the details for assuming responsibility were worked out in parallel.

In crisis 10 (Q2), a sub-contractor was lagging behind schedule in getting work completed. Initially, that work did not affect the rate of overall completion, but eventually it would. At several times the project manager and the site leader asked the contractor about progress, including sending formal letters in the matter but with no or limited result. After some discussions among the project team and the site team, it was decided that would have a confrontation with the sub-contractor. Consequently, there was a re-organisation of sub-contractor activities, and closer control on progress was exercised through ongoing negotiations. In this situation, the activities of the team were part of in-house services and project team tasks.

In crisis 1 (Q3), the cost was under-estimated for a project and not discovered until after the contract had been signed with the client. This matter was serious matter as it put pressure on the margins in the project. Given the seriousness of the situation it required the input from the line management. In the end, lower margins were accepted, but only after some buffers and costs had been re-arranged by the project team.

Quadrant 4 contained crises that were all cumulative and involved corporate staff. For instance, crisis 4 involved some taxation issues, which severely threatened that project budget. Staff accountants had known that at some time international taxation was going to become important on a project. It was not a matter of “if”, but “when”. Once the crisis emerged in this project, the project team involved sales, legal services and other project members in how they could come to terms with the situation. The legal office researched the approach that might be used and contacted foreign legal authorities in the matter. The situation finally was remedied through sales, which had had a similar project in the country, and the final resolution thus was found from sources outside of the team.

5. Discussion

5.1. *The nature of constructions crises*

The purpose of this paper was to review the nature of interruptions that have interfered with project progress in a “projects-as-practice” approach and reflect upon the remedies that were used in dealing with them. Fifteen cases were collected that in one way or another reflected internal or external events that stressed organisational resources and

posed threats to the specific company’s security and vitality [12]. On the surface, one might be tempted to dismiss the examples as trivial. That is, they were not tsunamis, earthquakes, or fires. In fact, most of them seemed rather mundane. Crises, however, are associated with consequences. In the special case of projects, interruptions on the critical path become critical. Left to their continuation, they certainly would affect cost and timing objectives. Further, they have the ability to focus negative attention on the company and have an adverse effect on its financial condition, its relationships with its audiences, and its reputation in the marketplace [13]. Thus, one of the contributions of this paper has been the collection and identification of these crises.

Roux-Dufort [13] has suggested that the definition used for a crisis affects the approach to crisis management itself, and he expressed a special regard for understanding crises that result from an accumulation of deficiencies and weaknesses rather than as a sudden and extraordinary irruption. In this respect, both abrupt and cumulative situations were noted here. Although generalities cannot be made from the data, it was observed that abrupt and cumulative crises appeared in about equal proportions. Further, they were observed throughout the project life cycle. The majority of these crises had an involvement with contractual disputes (9/15), but others came from a variety of sources, quite unanticipated and in some cases rather spectacular sources such as the guerrilla attack. These sources differed from Reid’s [13] list, which could be a consequence of the use of a case study approach compared to a survey, but the possibility also exists that the US work represented a focus on the extraordinary.

Regardless of cause, it might appear that a number of crises could have been anticipated. That tends to be the case in retrospective analysis. Who among us has not said to him/herself, I should have thought about that before? The company did exercise risk analysis and management, however, as part of its planning and operational procedures. Because only crises were studied here, one does not know how many crises the risk analysis and planning may have prevented. The important thing is that these crises did happen and tested the organisation’s capability to respond. In this regard, it was the project manager at the corporate setting who had ultimate responsibility in rectifying the situation.

5.2. *Management of crises*

A single company and 15 examples from it are not enough to specify normative practice. Nevertheless, a project-as-practice approach identifies practice. Thus, these observations are made:

Risk management was included in the planning for, and conduct of, projects.

The idea behind risk assessment is to be forewarned is to be forearmed. The nature of crises, however, is that they tend to be unanticipated [8]. It is thus likely that the one incident that will cause problems is not on the list. Conse-

quently, a response system needs to be reactive [13]. One aspect of the company's risk management program was that it had a report system that documented deviations and their treatment. Because this step was taken, there were people in the organisation aware of previous incidents and what had been done. Thus, there was some learning from past activities.

Elements of a dual structure were used in the company's organisation.

One of the problems with tightly structured systems is that incidents of failure in these systems tend to propagate [9–11]. The first order of business in crisis response is to prevent it from becoming a catastrophe and/or causing chaos. Recall that a typical project was organised with a project team at the corporate office and a site team situated where the project is being executed. This duality meant that in those situations of operational crises, the site manager had a ready, responsible respondent with whom to communicate in the event of trouble. Further, the company maintained in-house legal, human resources and engineering capabilities. For both the project and the site team there were these additional resources and expertise to utilise in handling these incidents at the operational level. These staff members were also the source of expertise and effort in the cumulative, or creeping, crises.

One consequence of dual structure was "instantaneous" communication of crises between site team and project team.

There is common agreement in the literature that a crisis response system requires communication of initial events as early as possible [9,12,16]. A function of the dual structure was that regular communication between site and corporation operations was the norm. Consequently, communication of an extraordinary nature was facilitated and the operational crises received the early communication that was desired. It was the cumulative or creeping crises that were insidious in this respect. Because "everyone" knew of their existence, it was easy for them to receive the "deaf ears" treatment described by Reid [13, p. 8].

Both formally and informally developed teams were used to handle situations.

If an organisation is to run a variety of projects, it is likely to experience a variety of crises. The response should fit the situation. Tiger teams [1], cheetah teams [19,20], ad hoc groups [13] were used as seemed appropriate. In those situations where a crisis became suddenly apparent, a group would be formed to specifically handle the situation. On the other hand, crises that crept into operations were handled informally within the framework of ongoing activities. For instance, crisis 4 (quadrant 4) was a cumulative example. Once the crisis became critical, the project team involved sales, legal services and other project members in coming to terms with the situation. That is, it was the task and not some structure that held the team together. Thus, it seems unlikely that a common approach for crisis management is useful in agreement with Loosemore [16]. There are situations that need immediate responses from all necessary and available resources. On the other hand,

there are situations where a more measured approach seems to work.

6. Conclusions

As suggested from the literature, both abrupt and cumulative were observed in a project as practice study of an international construction firm despite the company's approach to risk management. Because they do occur, one tends to be sceptical of abilities to anticipate them. As a list of actual observations, some occurrences seemed rather mundane but nevertheless interrupted project progress. In this case, the majority of cases dealt with contract disputes, which is at variance with other observations. The tendency is to believe that perhaps other lists are spectacular oriented. Although a variety of groups were used to deal with these crises, ultimate responsibility for their treatment lay with the corporate project manager in a dual structure organisation.

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