ORGANIZATIONAL FLEXIBILITY FOR EXTREME SCENARIOS EFFECTIVENESS

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STakeholders continuous pressure for technical quality of service improvement over electrical distributors is demanded “on every day” basis. Yet, extreme scenarios require organizational flexibility to improve operational effectiveness and recovery time in the electrical network.

In 2009, EDP Distribuição (EDPD) approved the business continuity plan for electricity distribution, named POAC. Since then, when activation criteria are met, the plan is launched adjusting organizational model over operational procedures, human (internal and contractors) and material resources to engage in the response, entities involved (liaison contacts such as weather institute, civil protection, firemen, police, municipalities, telecommunications operators and media), priority premises and guidance about event record and post-event analysis.

Several extreme scenarios occurred, after 2009, allowing EDPD to compare its performance before and after POAC’s approval while benchmarking with other electrical utilities.

INTRODUCTION

Having mostly overhead HV and MV network, EDPD permanently monitors weather forecasts in order to anticipate more demanding conditions such as heavy rain, thunderstorm, strong winds, snow or extreme heat.

On a weekly basis, national civil protection authority (ANPC) gathers several public and private entities that are coordinated by this organism in case of public safety issues, derived from natural causes, where these forthcoming events are analyzed and discussed. Among these entities, besides EDPD, gas, water and telecommunication operators are present, along with police, firemen and the medical emergency response system.

Reports and other relevant information gathered in this forum are disseminated inside EDPD, especially to all operational departments, creating, when necessary, a common sense of urgency and preparation for possible extreme events expected in the next hours or days.

In order to ensure proper preparation, EDPD simulate these extreme scenarios, on a regional basis, at least four times during the year, to train dispatch and field teams, review operational procedures, test telecommunications network (gsm mobile and radio) and evaluate its logistics capacity enabling the continuous improvement in all these aspects.

RULES OF ENGAGEMENT

Activation and possible evolution

POAC defines three levels of action: “alert”, “disturbed” and “emergency”. “Alert” is triggered when weather and civil protection reports expect severe weather conditions. It implies the reinforcement of human resources in the Dispatches centers, contact centers and in the field teams where these phenomena may occur.

Depending on severe conditions concretization, and in that case, their effects both in number of network’s incidents and in number of affected clients, POAC level may evolve from “alert” to “disturbed/emergency”.

Tactile change

This evolution presumes the activation of operational centers on a regional/local basis; field teams will communicate firstly to these centers instead of directly to the dispatches, preventing communications overflow. Non-operational workers are called to support all logistics associated with operations, regardless time or day of the week. National or regional crisis offices are also set, accordingly with the POAC organizational model and aligned with the focus of the extreme scenario, centralizing communication with external stakeholders.

The disturbed level assumes high simultaneity of incidents occurring on the electrical network. Therefore, there are an abnormal number of field teams involved in operations and this “new entity” (operational center) is the first level for field team’s contacts and monitoring events. There is a permanent communication between dispatches and operating centers for establishing
prioritization of interventions.

The emergency level involves an extraordinary set of events with huge repercussion on the general population such as for example natural disasters, terrorist attacks or electrical blackouts. All possible means of action must be mobilized to serve the company efforts to reestablish normality.

In presence of a crisis situation, whether declared disturbed or emergency state, it becomes imperative the company’s mobilization to promote the best possible response to the destructive events occurred on the electrical network.

These extreme events may cover large geographic areas or be locally circumscribed; depending on the situation, procedures regarding human and material resources differ considerably.

When the incidence area covers significant parts of the territory, it requires considerable mobilization of resources (internal and external), prioritization of field intervention and the extension of the logistic chain to support it. Under these circumstances, the primary focus is the correct management of available resources, providing an agile and effective safe response (supported on the network recovery time), in a client orientated performance. Simultaneously, it is very important the collection of field evidences of the events, necessary for post-mortem reports (to present to insurance companies and regulator), as well as the correct registration of the various tasks executed (materials used, generators connected, worked hours,…).

If the incidence area is locally circumscribed, it is possible to mobilize resources from other areas, concentrating means and capacity which generally promotes a quicker response compared to the previous situation described. These events also allow the transfer of the command and management structure (operational center) to the affected area, giving a totally different visibility of the work carried out.

It is our experience that in any of the above scenarios, the activation of disturbed or emergency state proves to be much more effective when all stakeholders in this process fully respect the POAC protocols established (hierarchy and interconnection between dispatch centers and operational centers on the ground).

**Communication and Stakeholders interaction**

During the time it takes the incident response and the recovery operation, EDPD is focused on institutional communication, keeping consumers and producers updated of the progress through telephonic lines directed to the contact center, the media or the internet site.

On a different level, operational communication flows intensively with stakeholders such as civil protection or municipal authorities, in order to share relevant information. Dispatches, operational centers, operational field teams and service providers, are in permanent contact to solve as quickly and safe, as possible, the problems encountered.

**Stress Management**

EDPD is also aware of the pressure that workers experience during these extreme scenarios, which may induce high levels of stress.

Therefore, to be effective in its performance, EDPD considers extremely relevant, aside with the technical aspects described above, the behavioral competencies that workers must have to deal with disruptive events and the deployed of human resources management tools that prevent having teams reaching exhaustion.

EDPD has been working on this subject since the storm Gong. In effect, after the recovery, assessment meetings were held, in order to identify improvements and corrective actions, leading to the formal approval of a revised POAC on December 2013. Among a series of key improvements and corrective actions, it was established the need to implement new personnel management tools that enable a closer monitoring of the energy levels of the teams involved in storm recoveries.
As a result, it is being implemented a new operation matrix and an online tool to register information regarding the teams’ management, in order to ensure continuity of operation in the network without teams reaching exhaustion.

Along with this improvement, team leaders play an important role as they must make high-stake decisions under time constraint. In effect, in an emergency response situation time is critical, since any time spent on decision planning is unavailable for decision execution. In addition, emergencies also entail risk of life and property, adding to the need to make fast but accurate decisions (Gu and Mendonça, 2008). Since decision makers have to manage tradeoffs considering the available resources to achieve the most effective response possible, leadership is crucial, as it’s necessary to drive teams to do their best, but always assuring its safety.

EDPD recognizes the important role played by these key players, providing them a set of tools that enable the optimization of their leadership. In terms of stress management there has already been identified the individual stress profile of a group of important leaders in our organization, which was followed by workshops that intended to help them to minimize the harmful effects that stress can cause, aiming their individual efficiency as well as the efficiency of their teams.

Although it is recognized that behavior, whether performed under normal circumstances or during a crisis, always involves a blend of planned, but also improvised elements (Mendonça et al., 2010), exposure to a wide variety of training situations contributes to the ability of reacting more adequately to stress inducing factors. Therefore, EDPD has a set of training courses available to all workers concerning the development of attitudes and behaviors that enable an effective response to disruptive events.

In order to identify opportunities to improve resilience through existing planning mechanisms and emergency preparedness, EDPD has also established a protocol with the Faculty of Psychology (Lisbon’s University) having in sight the assessment and diagnose of the teams’ resilience mechanisms, which will enable the development of tools designed to manage and improve the necessary skills to deal with disruptive events. Improving the ability to resist disorder, retain control, continue and rebuild, EDPD will create a more crisis resilient workforce.

**PERFORMANCE AND RESULTS**

Being the staff safety one of EDPD core drivers the first achievement is that despite the extremely unfavorable conditions to perform work on the electric grid during these events, EDPD hasn’t had accidents with workers or population. These results can only be accomplished due to the high level of expertise, commitment and cooperation from the teams.

In terms of “recovery time”, and even though such comparison is difficult, the EDPD response assessment was made by comparing Portuguese extreme scenarios since 2009 (POAC’s approval), being evident that recovery time in emergency scenarios was significantly reduced in the last 5 years, in some cases in 50% (Table 1).

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<tr>
<td><strong>Characterization</strong></td>
<td></td>
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</tr>
<tr>
<td>Phenomenon</td>
<td>Depression – Explosive Cyclogenesis</td>
<td>Depression – Explosive Cyclogenesis</td>
</tr>
<tr>
<td>Length</td>
<td>Regional</td>
<td>National</td>
</tr>
<tr>
<td>Max affected customers</td>
<td>424,000</td>
<td>1,100,000 (2.6x)</td>
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<tr>
<td><strong>Affected infrastructures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV lines</td>
<td>0</td>
<td>40 (-)</td>
</tr>
<tr>
<td>HV/MV substations</td>
<td>0</td>
<td>20 (-)</td>
</tr>
<tr>
<td>MV lines</td>
<td>115</td>
<td>471 (4.1x)</td>
</tr>
<tr>
<td>Poles (HV, MV, LV)</td>
<td>726</td>
<td>4,099 (5.6x)</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
<td></td>
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<tr>
<td>Human resources</td>
<td>750</td>
<td>3,446 (4.6x)</td>
</tr>
<tr>
<td>Vehicles</td>
<td>360</td>
<td>1,694 (4.7x)</td>
</tr>
<tr>
<td>Power generators</td>
<td>50</td>
<td>339 (6.8x)</td>
</tr>
<tr>
<td><strong>Total time</strong></td>
<td>5 days</td>
<td>8.5 days (1.7x)</td>
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Through public information EDPD also benchmarked recent extraordinary events (from storm Ike in 2008 and storm Sandy in 2012, both in USA, to storm Klaus in 2009 that affected both Spain and France) with other utilities and its results are aligned with the international best performances.

In 2014 the Business Continuity Institute (BCI) judges looked at how effective the recovery from storm Gong was across the whole spectrum of emergency and incident management including strategic, tactical and operational planning, and awarded POAC’s performance as the Most Effective European Recovery in 2013.

**FUTURE STEPS**

Even with excellent improvements in emergency response in the last years, EDPD is pushing themselves to achieve a higher level. The top management has promoted organizational changes that enable the efforts towards the response to bigger events, some of them that would immediately result in a disaster, others that, if not
promptly stopped, the outcome will be a disaster.

The first step to achieve that higher level is precisely understand the difference between emergency and disaster. While the first is a serious suddenly situation requiring immediate action in order to avoid harmful results, the second is also a serious suddenly situation but that causes great harm or/and loss of life. Most believe that the response to a disaster is achievable incrementing the resources that will be activate in an emergency situation, forgetting that the path between an emergency and a disaster is a disruptive one and not a linear incremental path. The simple fact that in a disaster scenario the organization could have loss some of their staff, could disrupt the organization initiatives to respond to an emergency situation.

Having understood this disruptive difference, the second step is to empower the organization with full time resources responsible to look after the efforts towards a higher resilience level. These resources, supported in Business Continuity good practices framework, such as ISO 22301:2012, will be capable not only to reinforce the organization emergency response but also to look after specific potential disaster scenarios, selecting adequate mitigation and preparation initiatives. The organization could achieve great success having the operational units working in emergency plans, but the resources available in those units to this subject will be most of the times overwhelmed with the diary operational activity. Having full time resources outside those units, the organization will more easily achieve an unbiased and wide view about the organization needs, integrating internal and external knowledge.

In EDPD examples of future steps that come from this organizational effort is the response plan to global system failure (example of a possible cyber-attack outcome), an emergency that, if not promptly stopped, could result in a disaster, and is the research towards anti-seismic network investment, being earthquakes examples of disasters where mitigation residual daily investments can do the difference in such a scenario.

CONCLUSIONS

Being confronted with severe natural phenomena, EDPD proved that having crisis predetermined protocols (POAC), and a culture of preparation and continuous improvement has benefits in service continuity in emergency scenarios.

In recent events, it was unanimously concluded that the quality of EDPD response strategy compared to previous similar events had served to heighten the organisation’s reputation. Two key factors which contributed greatly to its success were: the effectiveness of its improved POAC, and the level of communication and interaction between the organisation and the local authorities and other relevant parties.

Despite the success, at EDPD the POAC is constantly evolving and developing to meet both the growing demands of clients and the potential challenges, as well to ensure staff safety. That way, it can ensure that the next time the electricity network experiences an emergency or a disaster, EDPD is primed to respond.

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