

INCREASING DSO'S RESILIENCE BY EXERCISING BUSINESS CONTINUITY PLAN

Paulo ALBERTO
EDP Distribuição – Portugal
paulo.alberto@edp.pt

Inês Cândido SILVA
EDP Distribuição – Portugal
inescandido.silva@edp.pt

Nuno DUARTE
EDP Distribuição – Portugal
nuno.duarte@edp.pt

Tiago ROJÃO
EDP Distribuição – Portugal
tiago.rojao@edp.pt

Maria Luísa PESTANA
EDP Energias de Portugal – Portugal
marialuisa.pestana@edp.pt

ABSTRACT

Building and improving the resilience of a Distribution Grid, it's a very relevant part of all the electric Distribution System Operators (DSO's) activities. Considering that planning, and execute the best technical solutions for the grids, including innovation it's fully embedded, the capability of DSO's to respond and recover from disruptive events, it's the last step for the grid resiliency. Testing and exercising are some of the most effective tools for improving organizational resilience. A well-tested Business Continuity (BC) strategy, provides confidence to handle a disruption, and regular training and education of operational teams and key stakeholders are relevant requirements to incorporate awareness and develop the necessary skills to manage the plans in face of a disruption. The top management support and a dedicated BC team with exercise experts, are key points to maintain the certified EDP Distribuição (EDPD) Business Continuity Management System (BCMS), growing in maturity, compliance and continuous improvement. This paper aims to provide the EDPD practical experience on testing and exercising, and how we have integrated these activities within an agile BC Exercise Program, to improve organizational resilience.

INTRODUCTION

Business Continuity it's about building resilience into organizations. Nowadays, EDPD develop and maintain a systematic approach to improve resiliency and to reduce the impact from disruptions, with quick restoration capabilities of the power supply operation, strongly fostered by his BCMS.

BC refers to the capability of an organization to continue to deliver its products or services at acceptable predefined levels following a disruptive incident. Therefore, the existence of contingency, emergency or crisis plans, that define the response and reorganization of the company, along with BC planning, is an important step towards building resilience, as it prepares the organization to respond and recover, when a disruption strikes.

But the mere existence of such plans does not constitute by itself a guarantee that the recovery capacity is assured. Some factors such as the clarity and adequacy of defined procedures, knowledge and dissemination of its content, the integration of all the needs, the ability of people to adapt and respond in situations that can be very complex and likely to generate great pressure and stress, may affect

the expected results. In this context, it's fundamental to ensure that plans stand's up during critical periods, and that people know them well and are prepared to perform the right decisions at all the time. This is where testing and exercising comes into play; it enables to check – even recheck – the robustness of the existing plans, by identifying gaps, verifying readiness and to improve response capabilities, as much as to prepare people to act in very stressful and demanding contexts. As *Kay and Goldspink* [1], executives understand this need, and rate exercises and scenarios as a main aspect for preparedness, being indicative of the relevance of this topic. It is much better to find out that a plan has issues during an exercise, rather than during a crisis.

EDPD BUSINESS CONTINUITY MANAGEMENT SYSTEM

In 2013, EDPD created a BC Department with the goal to improve the company resiliency, and to enlarge its capacity to respond and recover when facing disruptive events. Since then the company established considering legal and regulatory recommendations and corporate internal norms, a BCMS according to the international standard ISO 22301:2012 Societal security - Business Continuity Management Systems, becoming in 2015, the first utility certified in the Iberia Peninsula and one of the first's in Europe.

The BCMS allowed the company, on a cyclic and organized process, to define its critical activities, by performing a Business Impact Analysis, and to identify potential risks and threats, and then to define adequate strategies to mitigate their occurrence or impact, as well as procedures and plans to face any disruptive events. With this strategy, the company its better prepared to over challenge its capabilities safeguarding stakeholder's interests, and its own reputation, developing its brand and adding value to improve its organizational resiliency. The approved and established Policy, Scope and Committees (including top management) combine with an established performance evaluation process, ensure the BCMS continuous improvement. A well-executed performance evaluation, results in a strong management feedback and help drive the implementation of corrective actions, thus improving and better aligning the BCMS to the organization's needs.

Regarding continuous improvement to respond to disruptive events, the company has developed several different types of plans, such as Contingency Plans, Emergency Plans, Crisis Plans or Communication Plans, which together compose the BC Plan. However, the simple establishment of this plans does not, by itself, assure that the company is fully prepared to respond and to recover from a disruptive event. As mentioned before, to assure business continuity, and to achieve a high level of preparedness in a sustainable organizational resilience, exercises and tests are fundamental for a successful BC strategy. Exercising and testing BC plans and its procedures, enables the organization to validate its capabilities to effectively respond to and recover from a disruptive event, within the defined timeframe. Therefore EDPD, when drawing the ground foundations to its BCMS, decided to incorporate specialized knowledge within this area, hiring an exercise specialist to its BC team, which was responsible to establish and maintain the EDPD Exercise Program [2], considered fundamental to the company objectives.

EDPD Exercise Program

Considering that exercises and tests, were a regular practice throughout the all company, the implementation of the BCMS needed to establish an upgrade to the existing practices, as required on clause 8.5 – “*The organization shall exercise and test its business continuity procedures to ensure that they are consistent with its business continuity objectives.*” [3]. To achieve this goal, EDPD developed an Exercise Program which has as primary objectives to (i) standardizing the planning, conducting and exercises evaluation, (ii) create and train response routines, validating the effectiveness of the existing plans and procedures (iii) inform, train and motivate employees, reinforcing their confidence to act in crisis situations and (iv) the identification of failures in procedures, systems or in the organization and the identification of improvement opportunities.

Exercise level and exercise evolution

In order to differentiate the range and engagement with exercises, four levels of Exercises were defined (Fig.1), considering the involvement of company departments or external entities, and as they are considered as strategically relevant to company and to BCMS.

The level 1 and 2 exercises are coordinated by the promoting department, the level 3 exercises can be either coordinated by the promoting department or BC Department, and level 4 exercises are exclusively coordinated by BC Department.

To assure that there’s an evolution on the conducted exercises, the program also defines that at every new exercise related with previous ones, all the opportunities for improvement identified should be included for effectiveness validation, and that exercises must upgrade on “*Difficulty Level*”, considering its complexity, range and involvement. These levels are defined in three different levels: Low, Medium or High.

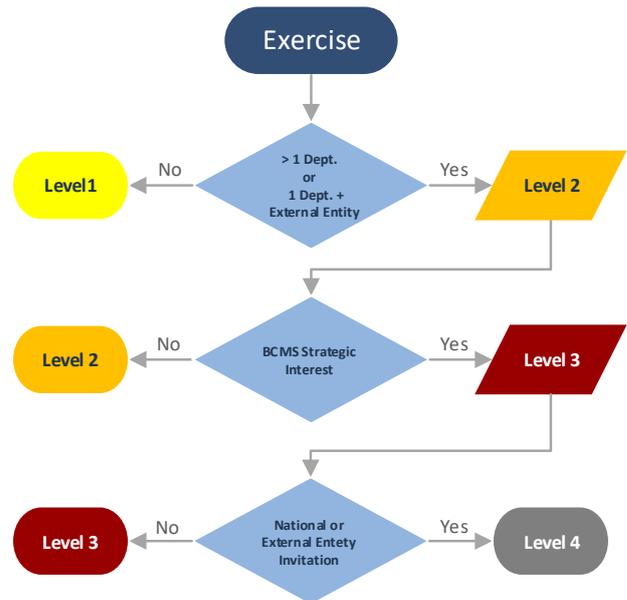


Figure 1 - Exercise Level

Exercises Types

The development of the Exercise Program was defined to sustain an evolutionary model, differentiated by its exercises complexity and difficulty, preferably considering also all existing precedences. Different alternatives were defined to allow to conduct effective exercises, according with the identified needs and proposed goals, and can be grouped in two categories - Operations-based exercises and Discussion-based exercises. The program includes the following types of exercises (Fig.2):

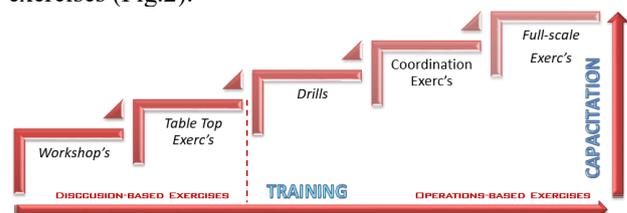


Figure 2 - Exercise Types

Workshops: Small group discussion sessions, usually used to introduce and orient participants to new or updated procedures or plans and their responsibilities or roles.

Table Top Exercises: Discussion exercises involving key participants on simulated scenarios in an informal and low stress setting. TTXs are used to promote discussions, as players decide according to their roles and responsibilities and the decision-making process, and are frequently used to assess plans, policies, and procedures.

Drills: Coordinated and supervised simulations usually employed to test specific operations or functions. This type of exercises can involve physical resources or personnel. It’s usually used to train specific parts of a plan, and can also be used as preparation to more wide range and complex exercises.

Coordination Exercises: Usually used to examine and/or validate and/or train coordination in a

specific contingency or crisis scenario, based on existing plans. This exercises usually allows to evaluate simultaneously, different actions or functions, their interoperability, policies and procedures, by simulating the movement of personnel or equipment's. It can be deployed causing high level of pressure to induce stress, on the decision-making process. **Full-scale Exercises:** Real live exercises, to test full capability and contingency of plans, as near as possible to reality. To be effective, it should include all the functions, activities and roles, defined within the plans, and test existing connections to other plans. Usually are deployed with high level of pressure, and involves effective personnel and resources, including third-parties, and external entities.

Exercise Planning Support

Beside the exercises directly promoted or coordinated by the BC Department, to achieve the defined objectives for the program, and to stimulate exercises development throughout the company, the BC Department its always available to provide support for all exercise needs that the different departments identify. In order to allow autonomy for the exercise planning and execution, but at some time to assure the necessary alignment, the BC Department also developed several support documents to be used in these tasks. The main document, "*Exercise Development Support Guide*" [4], its intended to be the reference and supporting document for the design, planning, execution and evaluation of all exercises, and is to be considered by all of those who are responsible for planning, executing and testing, the different types of response plans, or other identified training needs. The guide, provides all the information that is needed to identify exercise needs and to build adequate exercises. A careful exercise design is always useful, regardless of the exercise type, degree of difficulty, or size of the area(s) involved. A fundamental premise is that the Exercise Execution Cycle process must have sufficient flexibility to adapt to the effective testing or training needs of the area(s) involved. In this sense, it is essential to always consider that each task to be developed must be designed and applied to serve the organization, the specific objectives and the existing or installed capacities. The exercise program defined this cycle, considering five phases (Fig.3):



Figure 3 - Exercise Execution Cycle Phases

As part of this guide, several additional documents were produced, including four supporting notebooks that contains all the detailed steps, to consider for building an exercise in every one of the phases 1 to 4. These notebooks were designed to be used as a self-reflecting guide that helps the exercise responsible, in each one of the phases, to think and gather all the necessary information to design an efficient exercise. When used adequately, this document allows the planning team to make all the right considerations and gather all the information needed to fulfil the exercise specific documentation. **Notebook 1 - Thinking the Exercises:** Identifying the exercise requirements, presupposes in advance the need to decide on what is intended to be tested or trained, and how to achieve to do it. This reflection needs to be carried out by those who have the responsibility to ensure that the competencies for the execution of the existing plans remain high. In this sense, the responsible for the plans are invited to conduct an analysis to identify the specific exercise needs, according to the next steps: exercise needs assessment, existing plans analysis, evaluate conditions for exercise deliver, define exercise scope and goals, determine exercise level and difficulty level, execute impact analysis and risk assessment and accountability costs, establish main scenario and exercise narrative. **Notebook 2 - Planning the Exercise:** Planning the development of an exercise may involve a multiplicity of tasks, such as operational planning, administrative support work, requisition or acquisition of equipment's, dissemination and institutional communication, among others. In this sense, the Planning Team composition and the designation of a team leader - Exercise Coordinator - to coordinate the whole necessary activities, becomes fundamental. The dimension of this work group will always be adapted to the size and complexity of the exercise, and in its constitution, must be integrated experienced and knowledgeable elements, from each of the activities / functions involved in the exercise. This team is responsible for designing, developing, conducting and evaluating the entire execution of the exercise. In exercises of great size and complexity, it may be necessary to set up other teams to distribute roles and responsibilities during planning and conducting phases. The Exercise Coordinator is responsible to perform the following actions: identify the specific needs, define the exercise objectives, define the main events and the detailed events list, identify all the expected actions (for exercise evaluation), to prepare the messages list, and produce all exercise documentation, e.g.: exercise plan, scenario control plan, exercise evaluation plan. **Notebook 3 - Conducting the Exercise:** The delivery of an exercise will always depend on the quantity and quality of the planning that has been carried out, as well as the type of exercise, its difficulty level and the chosen scenario, but there are some conditions that must be verified in any type of exercise. The conduction of the exercise must be carried out by the Exercise Coordinator, who is responsible for initiating, closing and, if necessary, cancelling or suspending the

exercise. The conduct of the exercise can also be assisted by other elements of the planning team, according to the dimension and dispersion of the scenario. In some exercises with great involvement or complexity, a Scenario Control Team may be appointed, with the specific task of controlling the development of this, and may include controllers, referees and actors or simulators. This notebook, provides references for all the actions that the planning team is usually responsible to perform, including the following tasks: Participants reception and briefing, providing all the information about how the exercise will unfold, referring all the rules of operation and making available all the necessary additional information; ensure that the exercise is performed according to the set time-lapse; ensure that the exercise is achieving the defined objectives and if necessary correct / adapt the scenario events , whenever there are deviations that may condition the fulfilment of the defined goals; promote the advancement of discussions whenever participants are misled, the sense of exercise is distorted or there is an inability to move forward in solving the challenges that have arisen. **Notebook 4 - Evaluating the Exercise:** The exercise evaluation may be carried out by all the different participants in the exercise, starting with the designated evaluators or observers, but including players and simulators, as well as all those who, without an active role, were affected by the course of the exercise.

In the case of exercises with great involvement or complexity, an Evaluation Team may be appointed, with the specific mission for developing the evaluation methodology and evaluating the entire exercise. The evaluation process is the process of observing and the activities developed during the exercise. The observation will allow to compare the tasks performed with the defined objectives, evidencing the strengths of the tested plans and identifying opportunities for improvement. This notebook, provides references for all the necessary activities to assure a good evaluation, which will allow to collect relevant data for the whole process, such as: Verify that the exercise has met its objectives; Identify opportunities for improvement on existing planning or procedures; Identify opportunities for improvement in the management of accidents or incidents; Identify general or specific training needs; Identify needs for acquisition, improvement or introduction of new equipment; Identify the need to carry out new exercises, its type or area of execution. At the beginning of the exercise design, objectives are defined, and subsequently, this definition is adapted into specific objectives, which will be achieved by introducing specific events on the scenario, that will lead to a set of expected actions, from which, the evaluation process can be based. **Exercise Support Documents:** As already mentioned, all the necessary exercise related documents, where developed within the program, and a full list of templates are available to help fulfil all the planning and conducting needs, such as: e.g. Exercise Plan, Evaluation Forms (for evaluators, players and observers), scenario and briefings preparations checklist and after-action report).

Implement and Monitor Improvement Opportunities

For this phase, BC Department have established a process to monitor all opportunities for improvement outcome from exercises. As all exercises performed are registered at the exercise program, the issued final reports, which must include all identified corrective actions and opportunities for improvement, are evaluated and registered at a central database. After defining the person in charge for its implementation, and when necessary established an action plan for execution, the BC Department regularly check its deployment and conclusion, trough the BC subcommittee meetings, where all departments are represented at a high hierarchy level.

Exercise Program Implementation

Since 2015, when the Exercise Program was formally approved by the company board, a great variety of exercises have been conducted. As referred, EDPD considers that exercises are fundamental to guarantee an effective business continuity and to improve organizational resilience. As result of this commitment, after the first three-year cycle of its BCMS certification, the Exercise Program has continuously been appointed by the external auditor, as a key and strong point of the system. The different exercises, beside its level and type classification, are grouped by theme, such as Tests, Safety & Security, Crisis & Contingency and Operational Training (Table 1). Some of the most relevant examples of the executed exercises are:

Crisis & Contingency Exercises:

Exercise of the Crisis Operational Plan – for Distribution Grid (POAC-RD) – Level 3 exercise			
Plan Description: POAC-RD is the operational plan to respond to disruptive events on the distribution grid.			
Exercises Description: Table-top and Coordination Exercises were delivered, with the participation of all different areas involved in the plan, including board members and contractors.			
Exercise Numbers			
# Exercises	# Depts.	# Players	#Others ¹
12	37	247	121

¹ Controllers, Observers, Simulators and Guests

Exercise of the Crisis Response Plan – for Cyber Security (PARIS) – Level 4 exercise			
Plan Description: PARIS is the response plan that establishes the procedures to ensure better preparedness and response to cyber-security incidents.			
Exercises Description: CiberPerseu it’s a Portuguese Army Exercise, with participants from several national entities, that can interact according to a main storyline. Table-top exercises, have been conducted involving several departments, as EDPD additionally create its own storyline for response training.			
Exercise Numbers			
# Exercises	# Depts.	# Players	#Others ²
3	28	36	73

² Participant Entities

Exercise of the Dispatch Contingency Plan (PCD) – Level 2 exercise		
Plan Description: PCD is the contingency plan, that defines the procedures for transferring the grid supervision, to recursive dispatch centre and recover at an alternative back-up site.		
Exercises Description: Drills have been executed, involving the two company dispatches, on supervision transfer. Some scenarios included evacuation procedures.		
Exercise Numbers		
# Exercises	# Players	#Others ³
16	11	83

³ Controllers, Observers, Simulators and Guests

Other type of exercises and tests: **Tests:** Disaster Recovery Tests – 2x/year, Contingency Rooms Systems Tests – 6x/year, Radio Infrastructure Tests – 12x/year. **Safety Exercises:** Building Evacuation, Environmental Emergency's, Primary and secondary Substations Fires, Workers Rescue (head-lines and underground secondary substations) with external first-responders involvement. **Operational Training:** Alternative Dispatch Site Operation, Primary substations Contingency for Feeder Failure, Disturbed Low Voltage Grid Management.

	# Exercises
Crisis & Contingency Plans	46
Operational Training	26
Safety & Security	7
Test's	117
Total	196

Table 1- EDPD Exercise Numbers 2015-2017

LESSONS LEARNED

Effective training and well planned, executed and evaluated exercises, makes possible to highlight the difficulties normally experienced on the decision-making process and procedures accomplishment, when in face of extreme situations. It also allows to drive people to focus on early problems identification and on the exploitation for solutions, as it is also relevant to increase self-confidence levels on the individual capacities and competencies to act in crisis situations. Other important consequence, is the opportunity to promote coordination, cooperation and teamwork, including third-party relations management, by acquiring and sharing trust with relevant stakeholders, through establishing relations with their interlocutors, considered significantly relevant for the agility to recover from a disruptive event. Almost all the exercises carried out in this program, permitted a detailed observation of the generated responses during them, allowing the identification of several important opportunities for improvement, including the identification of training needs. It's also important to highlight that several opportunities for improvement related to plans or

procedures inconsistencies, were immediately identified in the planning phase, such as procedures that need to be updated, reformulated or defined precisely, because or they have never been put into practice or have never been tested through a detailed exercise planning.

CONCLUSIONS

The relevance of exercises and the systematization of their planning and execution, emerge as a relevant chance to identify opportunities for improvement in existing plans or procedures. The ability to think, plan, conduct and properly evaluate exercises, will reinforce the resilience of organizations, considering that the mere existence of plans, does not directly confer a “preparation status”. The challenges of implementing a program of this size and scope, are mainly the capacity to systematically evolve in its execution, being able to integrate more and more activities, with focus on the involvement of strategic decision-makers and top management, considered fundamental for crises resolution. The development of this Exercise Program, has brought to the organization, relevant capabilities and autonomy to different departments, allowing through its approach and document support, the evolution on exercising. EDPD, since established its Exercise Program, have conducted relevant exercises including Top Management Board, which has granted to the program the adequate empowerment to proceed with its objectives. The future challenges for this program will be the opportunity to design bigger exercises, that emphasises the DSO's challenges during crisis situations, bringing on board as participants and or observers, relevant stakeholders such as regulators and official entities.

REFERENCES

- [1] Kay, Robert & Goldspink, Chris, 2012, “*CEO Perspectives on Organisational Resilience*”, Australia, 8-9.
- [2] EDP Distribuição, “*PN 22.004-6 – EDPD Programa de Exercícios*”, 2015.
- [3] International standard, “*Societal security — Business continuity management systems — Requirements*”, ISO 22301:2012 (E), Corrected edition 2012-06-15.
- [4] EDP Distribuição, “*PN 22.004-6.1 – EDPD Guião de Apoio ao Desenvolvimento de Exercícios*”, 2015.