

Subject: **TYPICAL SWITCHGEAR DEVELOPMENT R&D SERVICES**

**READ FIRST** about our experience and things, we helped to do:

**CV** <https://www.cognitor.com.br/Curriculum.html>

**R&D for switchgear manufacturers + testing labs ...** <https://www.cognitor.com.br/HelpedToDo.pdf>

**Recent example of case of success:** <https://www.cognitor.com.br/ArticleIcel.pdf>

TYPICAL SERVICE FOR SWITCHGEAR MANUFACTURERS (MV, LV)

(2 products = Design Review + Training including a copy of SwitchgearDesign)

(Switchgear, switchboards, panels, busducts of IEC62271-200 / IEC62271-307, IEC61439)

• **PRODUCT 1:**

- DESIGN REVIEW for development and testing of a product (to predict if will be approved in lab tests)

**OR**

- Analysis for the EXTENSION OF THE VALIDITY OF TEST REPORTS of an already tested equipment to an untested one of the same family - to avoid carrying out tests under the premises of IEC 62271-307.

• **PRODUCT2:**

- TRAINING + COPY of software [SwitchgearDesign](#). (Presential training)

Dear all.

In the last 20years, we have been helping many manufacturers all over the World to develop substations equipment like switchgear, switchboards, electric panels, and busbar systems. Before, I worked 25 years in a big testing lab from doing tests to the general management of 14 labs (high power, high voltage, Ex, EMC, mechanics, etc. Check the experience in the CV above. We can communicate in English, Spanish, Portuguese and +/- Italian and French.

Usually, after the initial ideas and developments, manufacturers need to go to testing labs to do tests and receive a test report to use in commercialization. We are experient in all the phases.

We do first a design review to avoid that your equipment fails in the real lab tests. A complete type test for a MV or LV electric panel may cost something between USD 40.000,00 to 80.000,00. A complete design review with experience plus virtual tests and suggestions for design improvements costs around 10% of these values. The main focus is to pass in the tests avoiding test repetitions.

Based on a long testing and design experience we developed the unique virtual testing software SwitchgearDesign that simulate the lab tests It is easy to use with a 2-days training and very useful to assess and to improve the design using less materials.

The main service we do is a design review PLUS a high-level training on how to verify and improve this and future designs. In the training we teach how to use the software tool. Usually, after the training you will not need our services anymore because will be able to do the design reviews by yourselves.

**WHAT IS THE DESIGN REVIEW (product 1) ?**

At first, the customer sends us the switchgear basic drawings with geometries, materials of the bars and enclosure, types of insulators / supports, normal and short-circuit currents and voltages. We review the design by simulating each test with SwitchgearDesign. We verify whether the design is suitable to pass in the tests or whether modifications are needed. If the design need improvements, we propose the changes and optimizations. Sergio

Feitoza (me) is the author of the SwitchgearDesign software. I developed it after working 25 years designing, doing tests, operating, and managing CEPEL's testing laboratories (high power, high voltage, EMC, materials, Ex...) the largest in South America. At the end of this text there are links about the validation of the simulations made with SwitchgearDesign (tests of temperature rise, short time currents and crest (electrodynamic forces and superheat), internal arc overpressures) and more. Check the links below for many articles written by me as well as CIGRE publications and IEC documents in which I am co-author.

The Design Review is also applicable to whom need an "extension of the validity of test reports" under the premises of IEC TR 62271-307. As coauthor of this IEC document, I know well how to use the rules of the tables to do a transparent and reliable 3<sup>rd</sup> part assessment. You can save money avoiding laboratory tests under the premises.

**The sequence of the work:** after reviewing the design, the customer usually produces the equipment prototype and goes to test it in the laboratory. Our work does not include witnessing the lab tests. We will also be available to clarify doubts between the end of the design review report and training up to the moment of the tests (within 4 months). Sometimes, before and during tests you will need to discuss with laboratory staff, for example, about the interpretation of test results or methods that may make the test more severe or onerous than it should be. In addition, it is necessary to define well what should be included in the test reports to avoid future tests, by using the premises of IEC62271-307. During tests, you can get in touch with us if you need assistance.

The final product 1 is a "Design Verification Report" with a focus on "passing the tests". Includes detailed analysis and suggestions from this consultant (see link of a typical report at the end of this text). As said, alternatively, the product may be an "Extension of the Validity of test reports" by IEC62271-307. In our 23-year history of doing this type of analysis, the probability of succeeding in tests is greater than 95% (but not 100%).

### **WHAT IS THE TRAINING (product 2) ?**

The training is a face-to-face / presential / "In Company". Each participant receives a copy of the SwitchgearDesign software and learn how to use it.

In some few cases, when the presential training is not feasible, we can provide a virtual training. In cases like this the program consists of 4 sessions of 3,5 hours each, covering the use of the software and main engineering concepts about the tests that can be simulated. The client provides the form of connection via the Web, generally using tools such as Teams, Skype, Zoom, Google Meet or similar. In case of a Web Training, if desired by the client, we can also cover part of the topics of the "Complementary" training. The total training duration is not increased.

In the case of a PRESENTIAL training it lasts 2 days (2 x 7h). The training program includes the contents of the Table 1 and Table 2 below. It is carried out in installations provided by the client, usually with up to 14 participants. It is the best option for whom want to go deeper in the concepts of substations and to upgrade the technical team level.

The supplied version of the software copy is the full DESKTOP VERSION in the occasion of the training. It is provided with no future maintenance commitments, other than providing the same copies as provided in the training. If there are updates and the customer contact me, I will be pleased to send the update with no cost. However, I do not have time to follow up to let you know that an update has been released.

Shortly before training we deliver a copy of the software (.exe) file with installation instructions (link below). Just to be clear, as is customary in the supply of software, the source code, prepared in Delphi language, is not provided to the client. It is understood that the customer, upon receiving the copy, agrees to use the software for services of his own company and that will not pass it on to third parties without a written authorization from COGNITOR.

**LECTURER:** The training is presented by Eng. Sergio Feitoza Costa - Diretor of Cognitor (CV above) [www.cognitor.com.br](http://www.cognitor.com.br)

**SEQUENCE OF EVENTS:**

The most frequent sequence of events is like in this table. Other options may be discussed.

1	Authorization of the work and purchase order or contract including receipt of drawings and technical information for the calculations to include in the design review report (Payment of 35% of the total value)	+1 day
2	Preparation and submission of the draft of the "Design Review Report"	+20 to 25 days
3	I send the software and installation instructions PLUS the preliminary design review report	+ 32 days
4	TRAINING	+/- 35 days
7	Emission of the final "Design Review Report" and payment (65%) for the services.	+ 40 days
8	End of the service but I remain clarifying doubts up to the realization of tests in the testing laboratory	

**PRICE, VALIDITY AND PAYMENT CONDITIONS:** The proposal is valid for the beginning of the work in up to 90 days. The total price, non-negotiable, is:

**Design Review + WEB Training including a copy of SwitchgearDesign**

Case by case but in the order of magnitude of USD 6000,00

**Design Review + PRESENTIAL Training including a copy of SwitchgearDesign**

Case by case but in the order of magnitude of USD 8500,00

(\*\*): If the training is PRESENTIAL, in addition to the price mentioned above, the customer is responsible for the voucher with 3 or 4 hotel nights, air ticket (flights in economic class, seats pre-booked and times chosen by the lecturer) and airport - company - airport transfer. These items must be supplied in advance by the customer. The customer is responsible for the infrastructure (location and equipment). It is necessary to have only a multimedia projector, whiteboard to write and that the participants have, for their use, a desktop or notebook where the software will be installed.

The purchase order or simplified contract must be issued before the start of the work. Payments must be made by bank transfer to [redacted]. PayPal may be eventually used if previously agreed.

Yours Sincerely  
Sergio Feitoza Costa – Director

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[THE LINKS TO THE PAGES AND VIDEOS, INCLUDING THE TYPICAL REPORT AND "USING SWITCHGEARDESIGN"](#) ,

- Typical "Design Verification Report"" (older model) :

[https://www.cognitor.com.br/TR\\_000\\_10\\_ENG\\_Standard\\_2013.pdf](https://www.cognitor.com.br/TR_000_10_ENG_Standard_2013.pdf)

- Typical design review report for IEC 62271-307 (under request after the start of the consultancy work):
- Video Description of the desktop version of the software SwitchgearDesign (not updated but the essential points do not change). <https://www.youtube.com/watch?v=l2kROAX5Ajc>
- Training program presented in Tables 1 and 2 of the PDF <https://www.cognitor.com.br/trainingENG.pdf>

- Video (from 2020 not updated): <https://www.youtube.com/watch?v=3expB4wHiCM>
- Validation of software SwitchgearDesign [https://www.cognitor.com.br/TR\\_071\\_ENG\\_ValidationSwitchgear.pdf](https://www.cognitor.com.br/TR_071_ENG_ValidationSwitchgear.pdf)
- Articles for free download <https://www.cognitor.com.br/Downloads1.html>

## REFERENCES

- [1] **IEC TR 60943:1998** - Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals. Issued by IEC Technical Committee TC 32.
- [2] **CIGRÈ BROCHURE 830 (2021)** – “SIMULATIONS FOR TEMPERATURE RISE CALCULATION”. (Sergio Feitoza Costa is co-author)
- [3] **CIGRÈ BROCHURE 740 (2018)** Contemporary design of **low-cost** substations in developing countries.
- [4] **Article “TEMPERATURE RISE LIMITS OF IEC 61439-1** : unclear values distort the LV switchgear market. (May,12, 2023) - <http://www.cognitor.com.br/IEC614391Table6.pdf>
- [5] **IEC62271-307 (2015)** - High-voltage switchgear and controlgear - Part 307: Guidance for the extension of validity of type tests of AC metal and solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV.

## OTHER USEFUL REFERENCES

- [6] **Article “METAL FOAM in SWITCHGEAR, switchboards & bus ducts**  
<http://www.cognitor.com.br/switchgearmetalfoam.pdf>
- [7] **ENVIRONMENTAL EFFICIENCY CERTIFICATE OF ELECTRICAL PRODUCTS (KG/MVA): TECHNICAL STANDARD & DEMO PROJECTS MANAGEMENT)**  
<http://www.cognitor.com.br/demo1certificate.pdf>
- [8] **SUBSTATIONS & LINES INNOVATIVE PRODUCTS. SMALL R&D CENTRES + TESTING LABORATORY**  
<https://www.cognitor.com.br/demo2Lab.pdf>
- [9] **ENVIRONMENTAL EFFICIENCY CERTIFICATE of electrical products (kg/MVA) . Draft of a technical standard**  
<http://www.cognitor.com.br/EnvironmentalEfficiencyCertificate.pdf>
- [10] **CIGRÈ BROCHURE 602 (2014)** Tools for Simulation of The Effects of the Internal Arc in T&D Switchgear,
- [11] **IMPROVEMENT OF QUALITY OF ELECTRIC SYSTEM INDEXES:**  
<https://www.cognitor.com.br/IEC602822sugestionstosc32afrombrazil.pdf>
- [12] **Free book by Sergio "RENEWABLE ENERGY + ENVIRONMENTAL EDUCATION TO TRY TO SAVE THE PLANET"** <https://www.cognitor.com.br/educationfortheplanet.pdf>

[13] Free book by Sergio **“SWITCHGEAR, BUSWAYS & ISOLATORS & SUBSTATIONS & LINES EQUIPMENT”**

[https://www.cognitor.com.br/Book\\_SE\\_SW\\_2013\\_ENG.pdf](https://www.cognitor.com.br/Book_SE_SW_2013_ENG.pdf)

[14] Free book by Sergio **“PROJECT SAVE RIO IN 10 YEARS:**

<https://www.cognitor.com.br/saverioENG.pdf>

[15] Visiting researcher training: <https://www.cognitor.com.br/trainingENG.pdf>

[16] Other reference articles free downloads <https://www.cognitor.com.br/Downloads1.html>

CV Sergio Feitoza Costa <https://www.cognitor.com.br/Curriculum.html>

Things Sergio helped to do <http://www.cognitor.com.br/HelpedToDo.pdf>

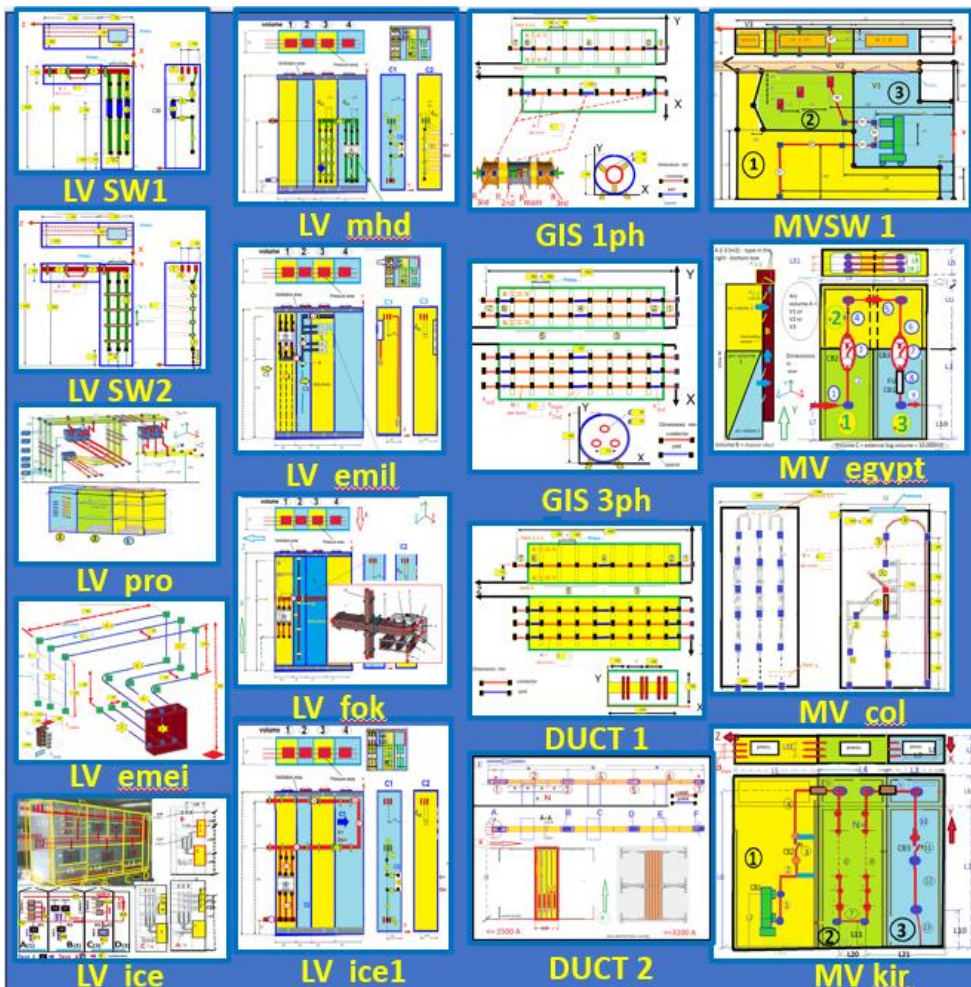
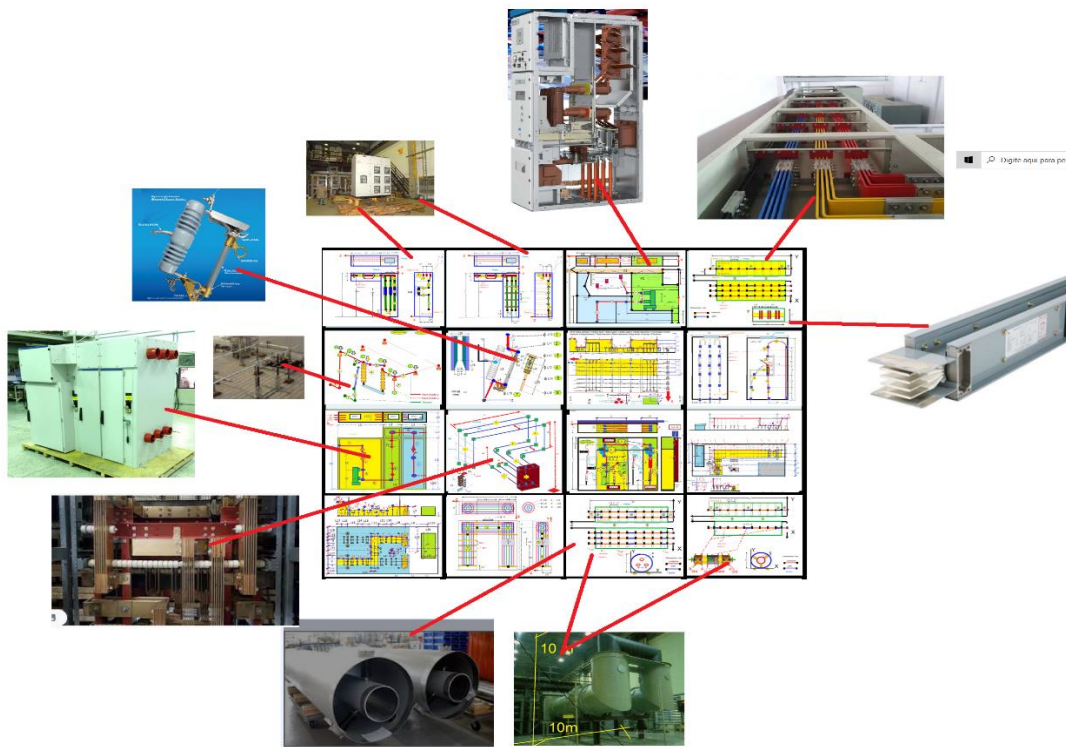
Site <https://www.cognitor.com.br>

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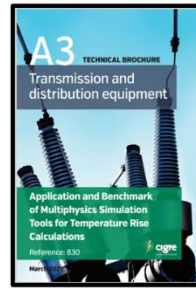
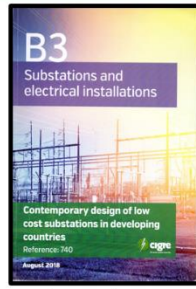
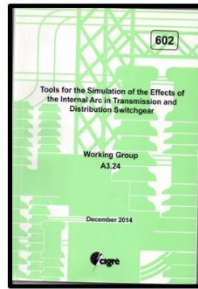
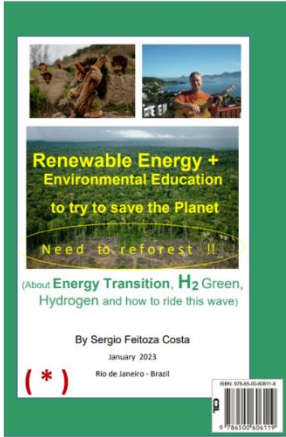
Linkedin profile (30K followers) : [linkedin.com/in/sergiofeitozacosta](https://www.linkedin.com/in/sergiofeitozacosta)



### Some Switchgear Design models



**Some training bibliography (Sergio Feitoza Costa is author or coauthor)**



**( \* ) free download in [www.cognitor.com.br](http://www.cognitor.com.br)**