HV / MV MOBILE SUBSTATION

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MATELEC
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1974 Matelec sal is founded by the Doumet and Moretti families for the manufacturing of distribution transformers under license from ALSTHOM UNELEC – France

1987 Development of the Engineering and Contracting division dedicated to the realization of complex HV, MV and LV projects

2002 Realization of the First Mobile Substation 132/11kV for the Iraqi Market
HV / MV MOBILE SUBSTATION MARKETS FOR MOBILE SUBSTATION

LEBANON

Tripoli
Batroun
Jbeil
Jounieh
Beirut
Damour
Saida
Tyr
Zahleh
Jezzine
Baalbek
Ghormine

SYRIA

IRAQ

30 Mobile Substations

5 Mobile Substations

30 Mobil Substations

POWERING ENERGY
WHAT IS A MOBILE SUBSTATION
It is a complete Electrical substation mounted in one or more semi-trailers.

- HV Equipments
- Power Transformer
- Auxiliary Transformer
- MV Switchgears
- Control & Protection Panels
- Auxiliary Services Panels
- Diesel generator
- Scada Panels
- Telecom Panels
- Several LV Panels...
HV / MV MOBILE SUBSTATION

CASE OF TWO TRAILERS
HV / MV MOBILE SUBSTATION

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WHEN & WHY
TO USE A MOBILE SUBSTATION
Emergency Situations:

In the Event of **Refurbishment or Maintenance** for a complete or partial substation where it must be taken out of service for a period of Time.
Emergency Situations:

In the Event of Main Equipment Failure without quick replacement capability.
Natural Disasters:
In the Event of Natural disasters or unpredictable events such as floods, fires, earthquakes or Transmission lines freeze where the supply of Vital Energy is a must.

Quick Assembly and Start-up: where the Mobile substation could be installed and Commissioned in few hours.
Temporary Needs:

The case of Peak-Loads Period where the Electrical Distribution Network is weak so the Mobile Substation could serve as Stand-by Unit.
Temporary Needs:
-In the case of any delay on the completing of the Designed plant buildings since the Mobile Substation doesn’t require any extensive building work.

Compactness: The Mobile substation could be installed in very reduced area without any need for special civil works.
Temporary Needs:

To avoid the risk of making large investments in a temporary primary/secondary substation which will no longer be used after completion of work.
Primary Distribution in isolated area:
It could be used for Primary Distribution in the isolated area to avoid any premature investments or build oversize plants.

Stand-Alone solution where the mobile substation could be installed in severe climatic conditions and faraway regions and could be controlled and monitored remotely via Dispatching Center.
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Our Research and Development department is always reviewing and studying the best released suitable solutions for each component of the Mobile substation.
For the HV External Equipments, the selection range is so wide and depends on clients requirements.
For the MV Switchgears and according to the client requirements and voltage level, we can supply either Air Insulated Switchgears AIS or GAZ Insulated Switchgears which reduces to the minimum possible the dimensions of the Switchgears.
The Control & Protection domain is one of the most evolutionary domain where you can notice an evolution approximately each month with a very large choice for the products.

**Protection Devices:**

The evolution has been done from the Mechanical Duty Devices to the Numerical compact Protection Devices achieving more advanced and more sophisticated functions.
The evolution in this domain is so important and interesting. We have changed from Traditional Control Panel with Mimic Diagrams to the advanced Scada Systems controlled remotely from a Dispatching Center.
Another domain of suitable solutions batteries where according to client requirement we adopt either a room dedicated for the batteries or a Complete Low maintenance sealed Battery Charger System mounted in a Single cubicle.
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CASE STUDY
HV / MV MOBILE SUBSTATION DESIGN CRITERIAS

- Client requirements stated in the contractual references

- The existing Network specifications at the final destination

- Relevant Standards (IEC or ANSI,...)
HV / MV MOBILE SUBSTATION DESIGN CRITERIAS

- Climatic Conditions of the End Location

- Transportation Constraints

- Installation Constraints

- Safety of Persons & Goods
HV / MV MOBILE SUBSTATION

ASSEMBLING & TESTING
The Assembling Team is constituted of well-trained & qualified Engineers and Technicians of at least 5 years of experience.

The Assembling will be done at Matelec site by the Design Offices.

The Assembling will be done at Matelec site according to the execution dossier released by the Design Engineers.

The Assembling Location is equipped by all the necessary tools for the Assembling process.
Large parking for the assembled trailers ready to be delivered which enables Matelec to build a large number of trailers in the same time and continuously.
A Complete Factory Test program will be realized on each Mobile substation where it will be Tested at Factory so only minor inspections & Tests will be needed at final destination.

The following non Exhaustive tests will be accomplished at Matelec’s assembling location:

- Visual Inspections
- Functional Test
- HV, MV and LV Equipments Tests according to the supplier recommendations
- Electrical Fault simulation
- Control, Protection and Voltage Regulation Tests
- Auxiliary Services Tests
- Energizing Tests
Multi Function System for Current, Voltage & Power Transformers Tests.

Circuit Breaker Analyzer and Micro Ohmmeter.

CBA - 1000 (ISA-Italy)

CPC100 (Omicron)

DRT-6 (ISA-Italy)

CMC 256 (Omicron)

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CASE STUDY
PACKING
TRANSPORTATION
One of the main cares of Matelec is the safe arrival of the goods to their final destination. Therefore, all the fragile components are packed with carton plastic-coated, while the porcelain bushings of the main equipments are packed with Stainless steel covers (if required).
Since every country has its own rules concerning the maximum admissible clearances of the road; therefore the Design of the Trailer should match and respect all of these clearances.

To ensure that the mobile substation has not been subject to over acceleration or accidental shock a Shock Log will be installed within the Mobile substations before delivery. A data reading & analyzing from this Shock Log will be realized just when the Trailers will reach their final destination.
INSTALLATION & COMMISSIONING
The installation of the Mobile Substation in its final destination is done as a Plug & Play solution.

The installation at final destination requires the minimum possible civil works.

All the mobile substations are delivered with Erection and Maintenance Documents. One of the most important documents is the General Instructions Document that should be entirely read carefully before Installation in order to prevent damages of equipments and wrong interventions of operators.

Matelec supervisor could monitor the erection and commissioning works if required.
For the LV Cables the connection will be done with a Plug – Socket connection.

For the MV Cable, the reels controlled manually or by an Electrical Motor will ensure an ease and quick installation for the cables with their plug in termination.
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CASE STUDY: MOBILE 60/30kV FOR SONELGAZ - ALGERIA
The 60/30kV mobile substation consists of the following bays:

- One Line Bay 60kV
- One Transformer Bay 60/30kV
- One Incoming Switchgear 30kV
- Four Outgoing Switchgears 30kV
TRAILERS

COMPONENTS
The 60 / 30 kV Mobile substation is composed of three trailers as following:

- HV TRAILER
- TRANSFORMER TRAILER
- MV TRAILER
PROTECTION SCHEME
The 60kV Line Bay consists of:

- Control & Protection Panel (+R1/S1):
  - Bay Control Unit
  - Primary Distance Protection
  - Back Up Protection

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**Diagram:**

- [Diagram of Line Bay Protection Scheme]

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ARMOIRE DE RELAYAGE ET DE PROTECTION (+R1/+S1)

- S301
- X301
- X301
- X302
- F21
- F51
- X401
- A1
- X402
- X402
- P50
  - Wh
  - VARh
The 60kV Transformer Bay consists of:

- Voltage Regulator
- Primary TR DIFFERENTIAL Protection
- Frequency Relay
- Overcurrent Protection HV & MV
- MV Neutral Protection
- Earth Fault Protection
- Tk Ptt
- Tk Protection
SCADA SYSTEM
WHY MATELEC?
Best Solution

✓ Acknowledgement of a large Market.

✓ Design of Customized Solutions.
Highest Quality

✓ Participating in the manufacturing phases.

✓ Complete Factory Acceptance Tests at Matelec.

✓ The application of IEC & ISO Standards.
Fastest Delivery

✓ The respect of deadlines.

✓ Short periods for Design, Study and Erection of turnkey projects.

✓ The follow up of the suppliers in order to meet the optimum time of deliveries.
Excellent After Sale Services

Whenever there is a problem on site, a team is sent for investigation & study of the case, and then the suitable solutions will be provided.
Team Work
Thank You!
QUESTIONS SESSION