Rising to New Heights: Exploring Vertical Walls and the MacRes System for Sustainable Infrastructure

MACCAFERRI

Speaker

Mutondwa Mushaathoni – Civil Engineer

CONTENT PAGE

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MACCAFERRI
Vertical walls are crucial in maximizing land use in densely populated urban areas.


MACCAFERRI
New infrastructure is continuously built
around the globe to keep up
with the need of economic development
and population growth.


MACCAFERRI
Vertical walls also enhance urban landscapes by providing visually appealing structures that integrate seamlessly into the environment.


MACCAFERRI
This is the reason why the demand for vertical structures has dramatically increased over the past few years.

The MacRes System is one of our flagship products, designed to meet the demands of contemporary urban planning.

WHO WE ARE

Maccaferri at a glance

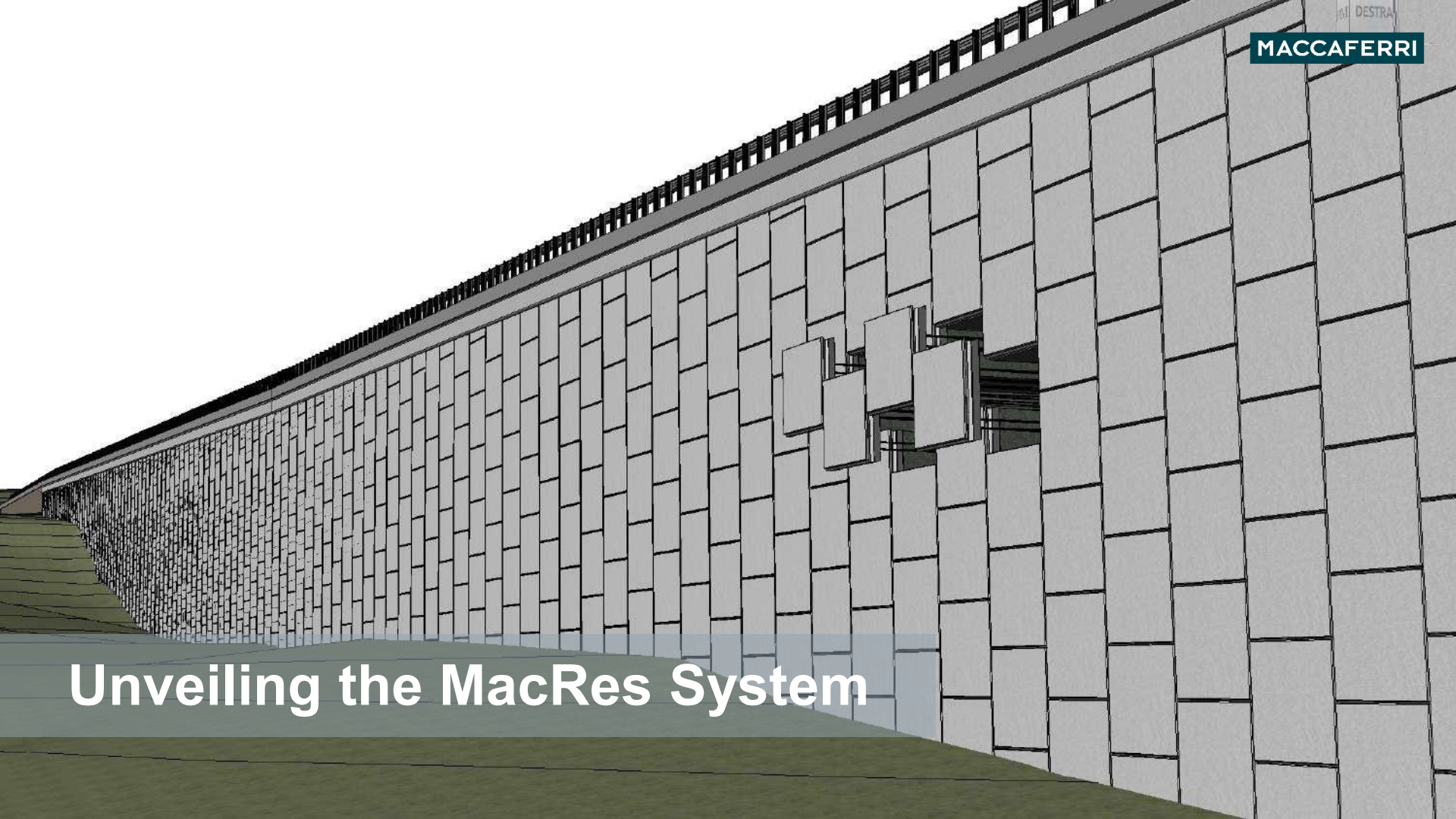
Sales in **100+** countries

Revenues ~ **600** M€

3,000+ employees

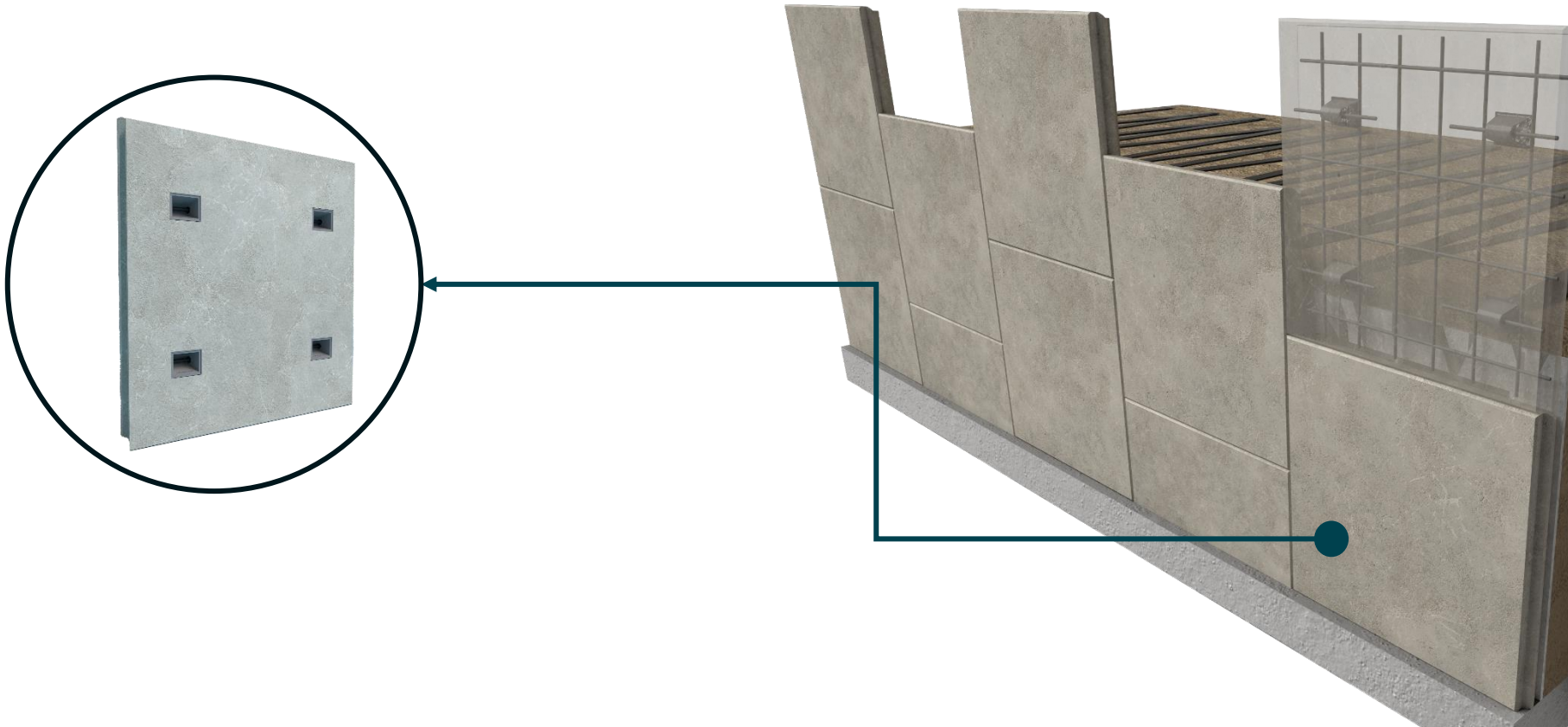
23 factories

70+ subsidiaries



Unveiling the MacRes System

MACRES SYSTEM



MACRES SYSTEM

Behind the wall - Panels

CONCRETE PANEL

Concrete type ***depends on project specifications,*** but minimum requirements are:

- Class XF1 and XC4 (according to EN 206 or equivalent, resistant to rainwater and de-icing salts)
- Minimum compressive strength at 28 days, >35 Mpa
- Geometric tolerances and finishing shall meet EN13369
- Minimum panel thickness is 14cm

MACRES SYSTEM

Behind the wall - Panels

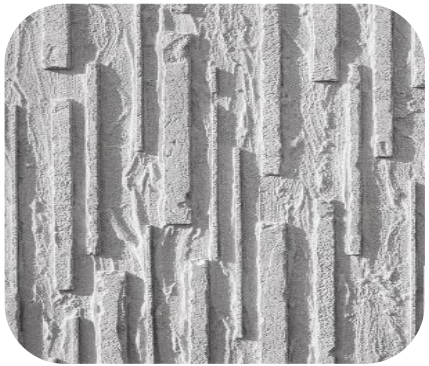
CONCRETE PANEL (VARIANTS)

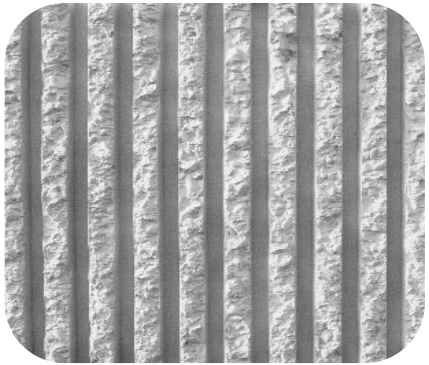
Several panels' geometries are available to meet finished elevation requirements:

- **Base Panels**
- **Standard Panels**
- **Top Panels**
- **Corner Elements**

FINISHING

MACCAFERRI


MACRES SYSTEM

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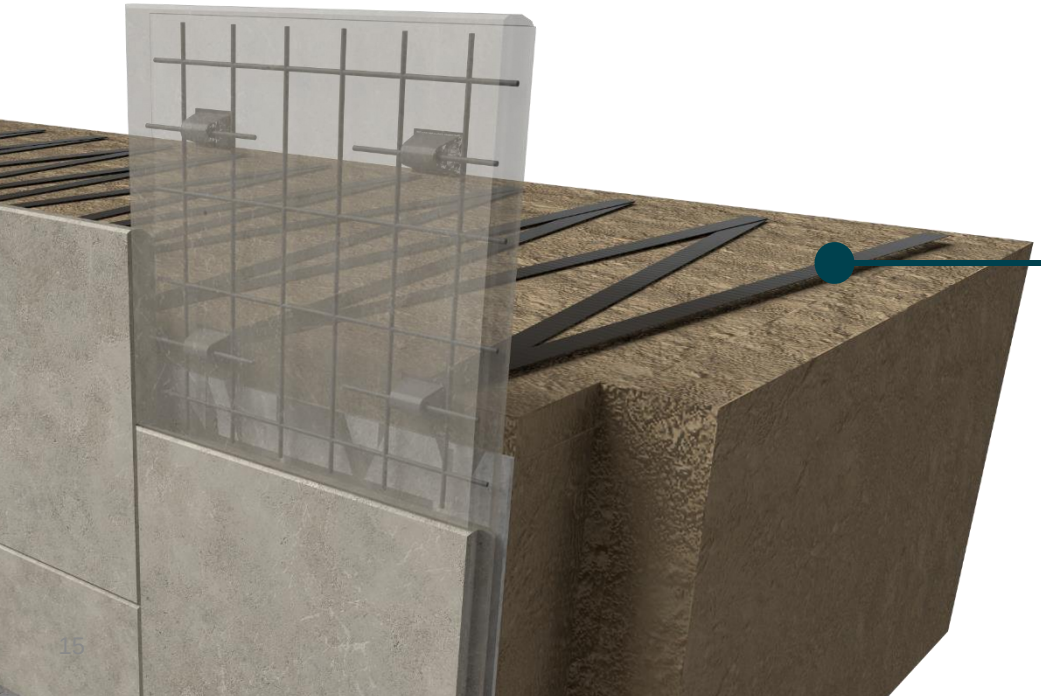
Behind the wall – Panels customization

MACRES SYSTEM

Behind the wall - Paraweb



PARAWEB

MACCAFERRI

Geostrip reinforcement

- Paraweb™ PET strips with LLDPE coating
- Rough surface which develops excellent friction
- Resistant to corrosion
- Several strip types available to optimize the design
- Durability tested up to 120 years
- Easy to be treated on site and ease of shipment
- International Certifications and Worldwide Experience
- Flexible and adaptable installation

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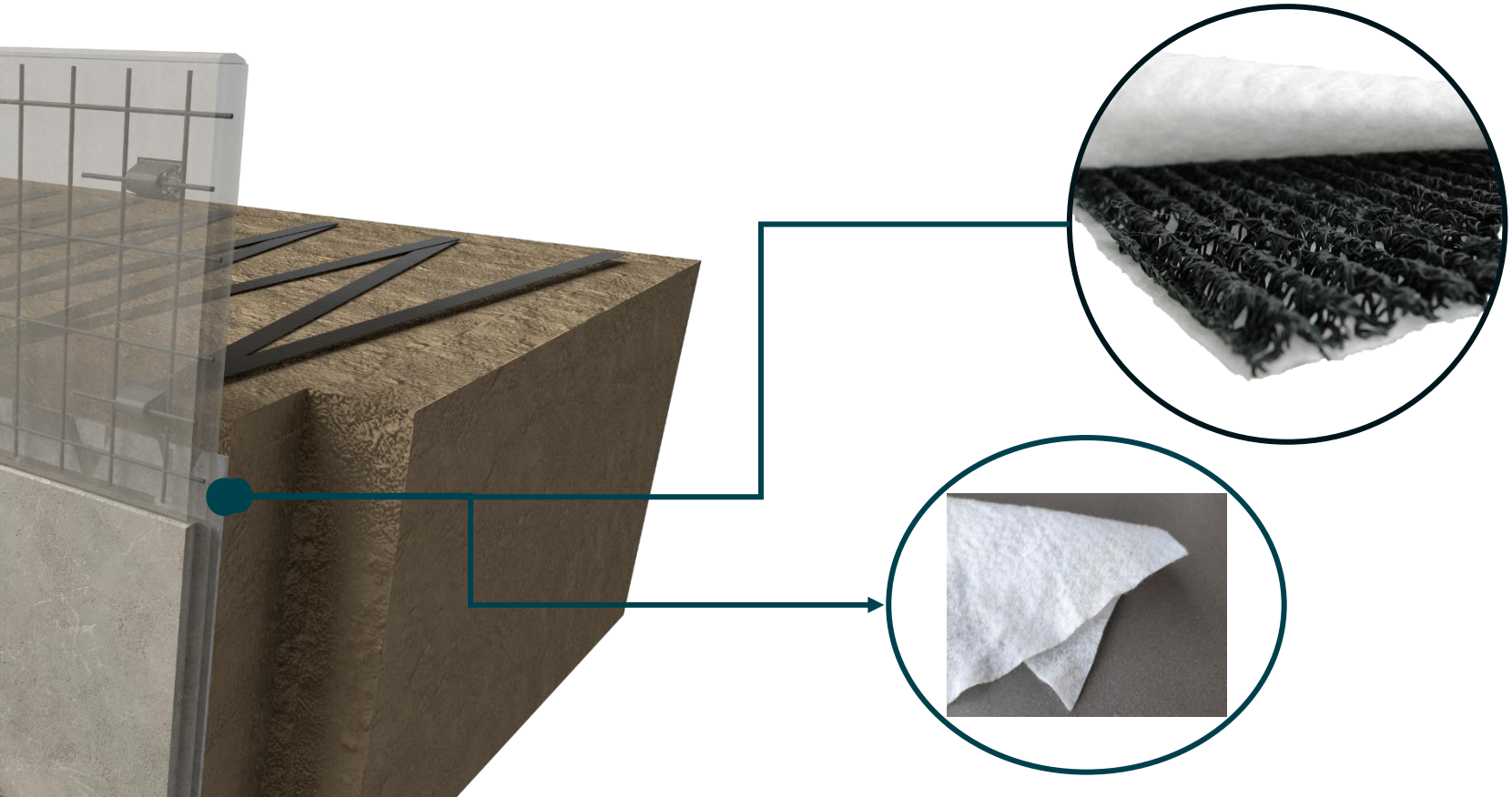
MACRES SYSTEM

Behind the wall – MacDrain and MacTex



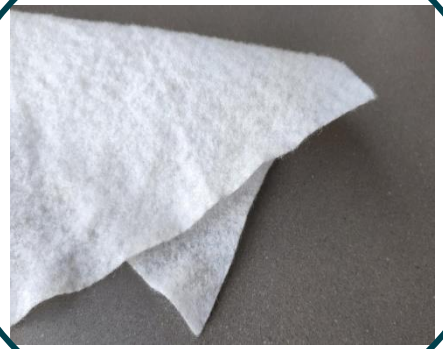
MACRES SYSTEM

Behind the wall

MACTEX

Nonwoven geotextile should meet local requirements for:

- Filtration
- Migration of fines

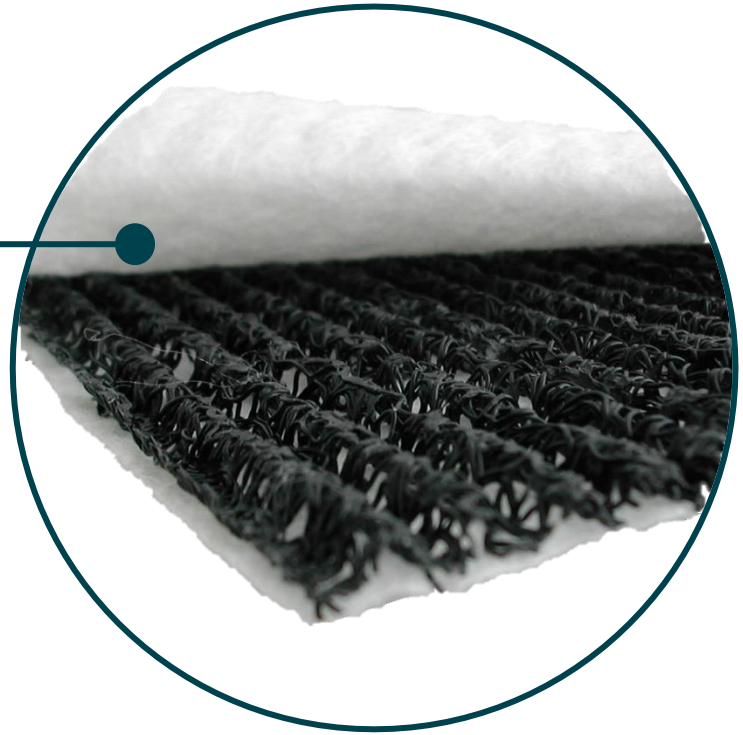


MACRES SYSTEM

Behind the wall

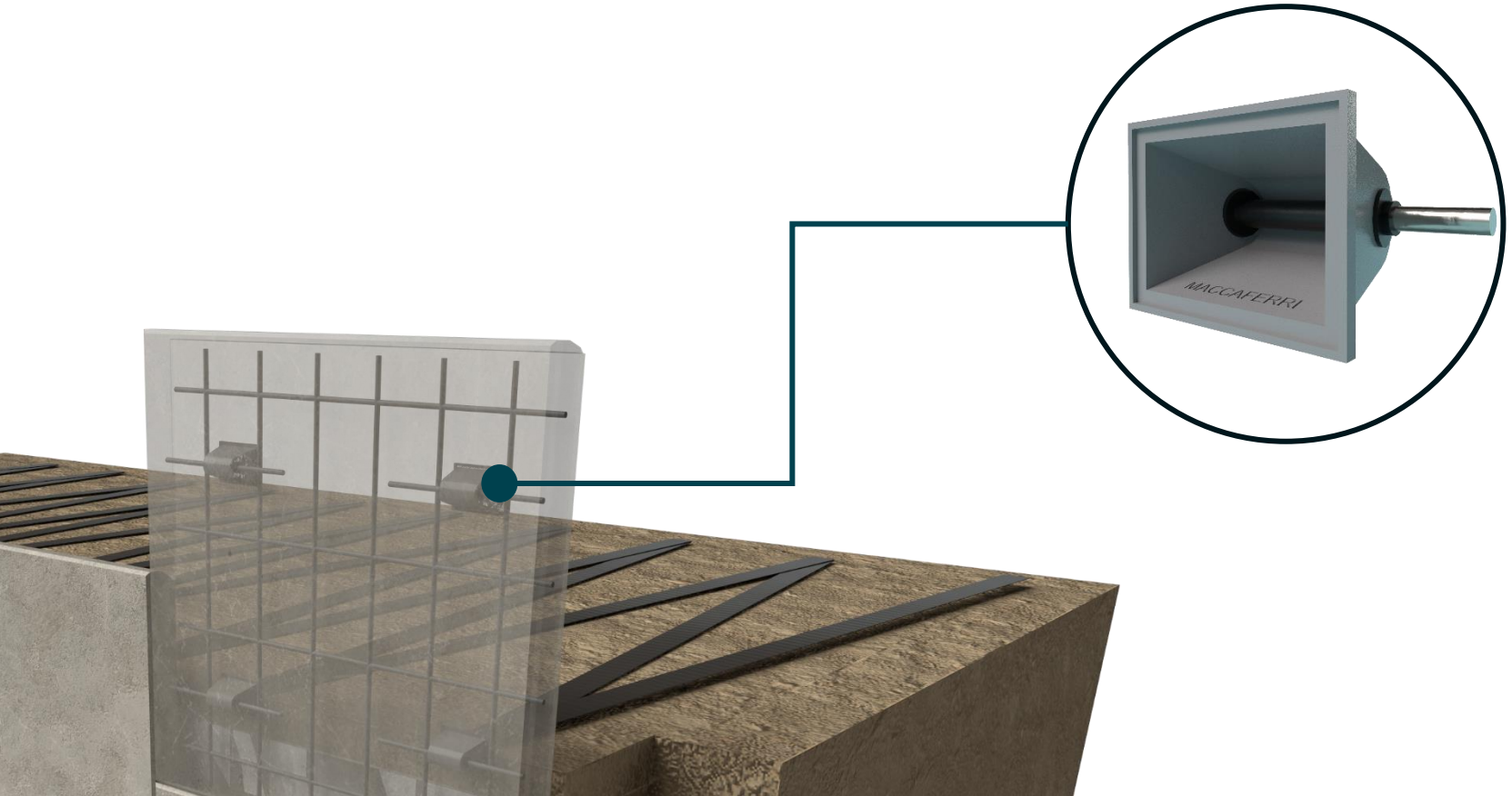
MACDRAIN

MacDrain is drainage geocomposite comprised of a flexible core and 1 or 2 non-woven geotextile filters.



MACRES SYSTEM

MACCAFERRI

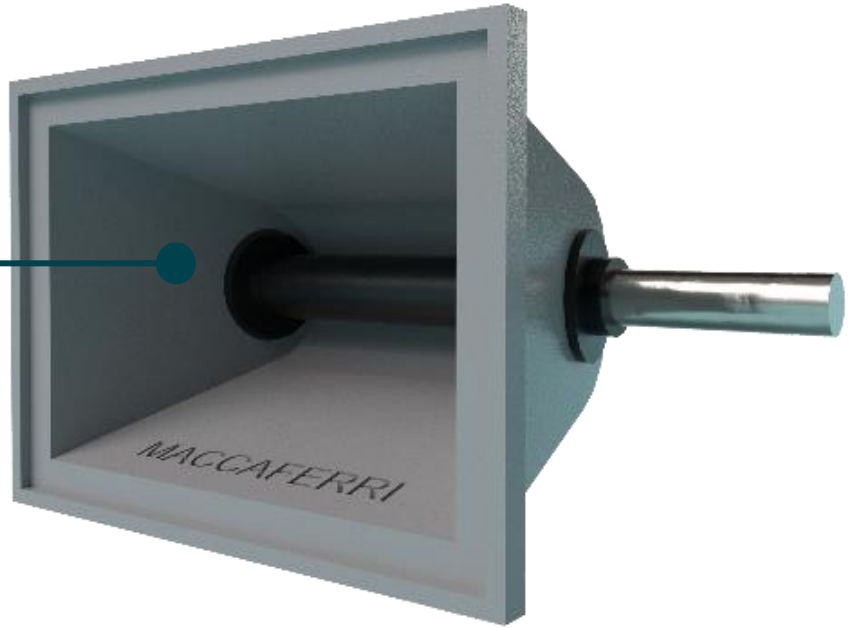


MACRES SYSTEM

Behind the wall - MacBox

MACBOX

MacBox: a HDPE cavity insert box.



MACRES SYSTEM

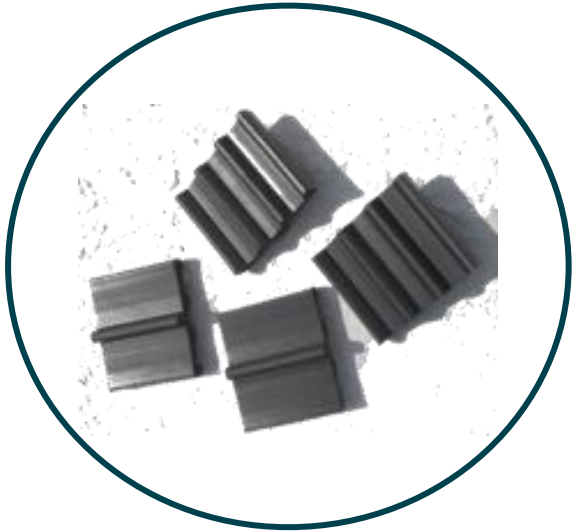
Behind the wall - MacLoop

MACLOOP

MacLoop: loop made of paraweb strips, protected by a polymeric saddle for ease of installation.

MACRES SYSTEM

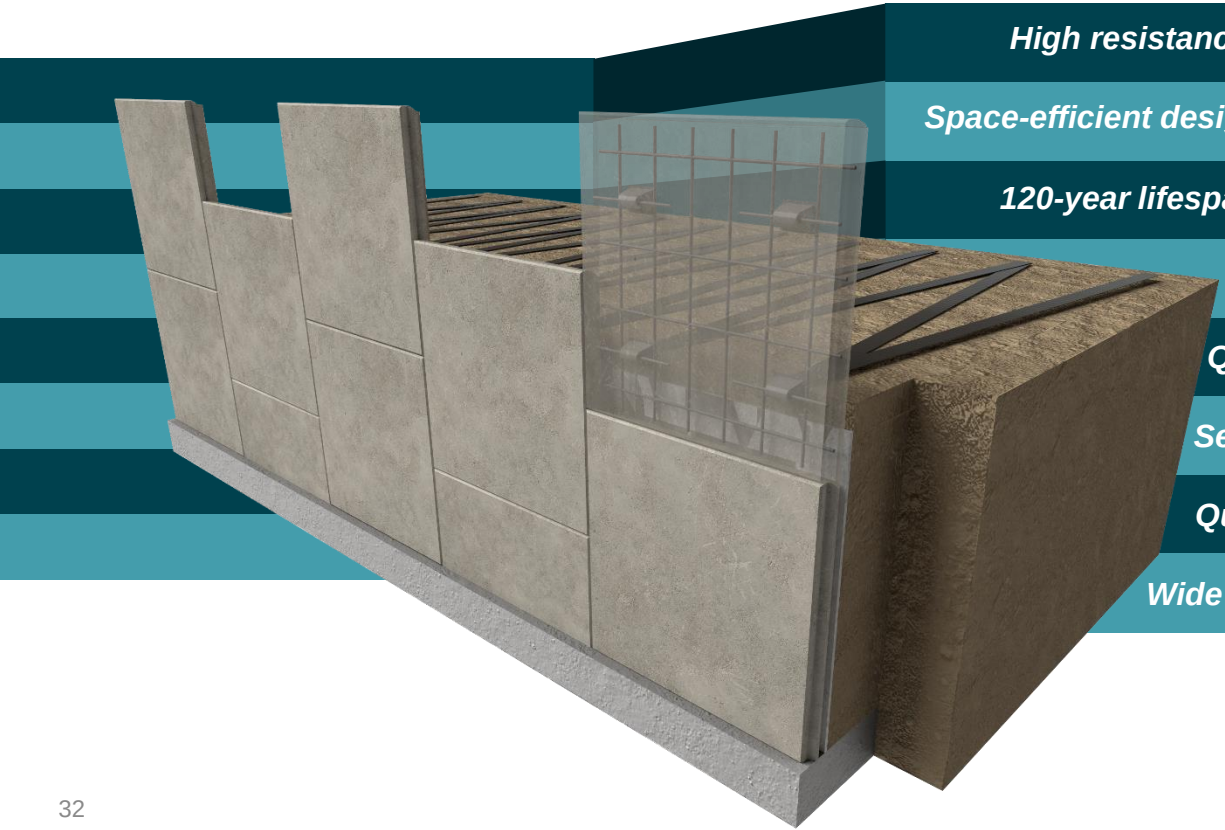
Behind the wall – EPDM Pads



EPDM PADS

Bearing pads are pre-formed EPDM rubber pads utilized to avoid concrete-to-concrete contact and to accomodate panels settlement.

MACRES SYSTEM



- *High resistance against seismic events*
- *Space-efficient design*
- *120-year lifespan engineering*
- *High alkaline environment durability*
- *Quick and easy installation capability*
- *Service disruption minimization*
- *Quality of life enhancement*
- *Wide range of customization options available*

Installation

INSTALLATION

Installation Procedure:

1.Excavation and foundation preparation

INSTALLATION

Installation Procedure:

1.Excavation and foundation preparation

2.Positioning the first row of panels

INSTALLATION

Installation Procedure:

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2.Positioning the first row of panels

3.Laying and compaction backfill

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4.Installation of soil reinforcing strips

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2.Positioning the first row of panels

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5.Repeat process

INSTALLATION

Installation Procedure:

1.Excavation and foundation preparation

2.Positioning the first row of panels

3.Laying and compaction backfill

4.Installation of soil reinforcing strips

5.Repeat process

6.Install subsequent rows of panels

Applications

TRANSPORTATION APPLICATION

St Pierre Bypass,
Mauritius

MINING APPLICATION

Klipspruite Mine,
South Africa

RAILWAY APPLICATION

East Africa


MACCAFERRI
ROAD OVER RAIL
Standard Gauge Rail,
Tanzania

MACCAFERRI

TRUE BRIDGE ABUTMENT

Ford Silverton,
South Africa

ROAD OVER RAIL

Phoenix ROR
Mauritius

Other Typical Applications

Soil reinforcement interaction is extremely important, as it is the mechanism through which forces are transferred between the geosynthetic reinforcement and the surrounding soil.

Design

DESIGN: WHAT DO WE NEED TO KNOW?

MACCAFERRI

- Ground
- Aesthetic
- Groundwater
- Durability and maintenance
- Construction requirements
- Row
- Environmental concerns
- Boundary Conditions

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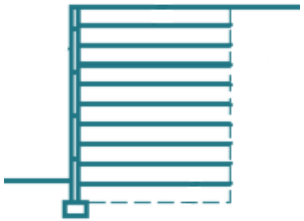
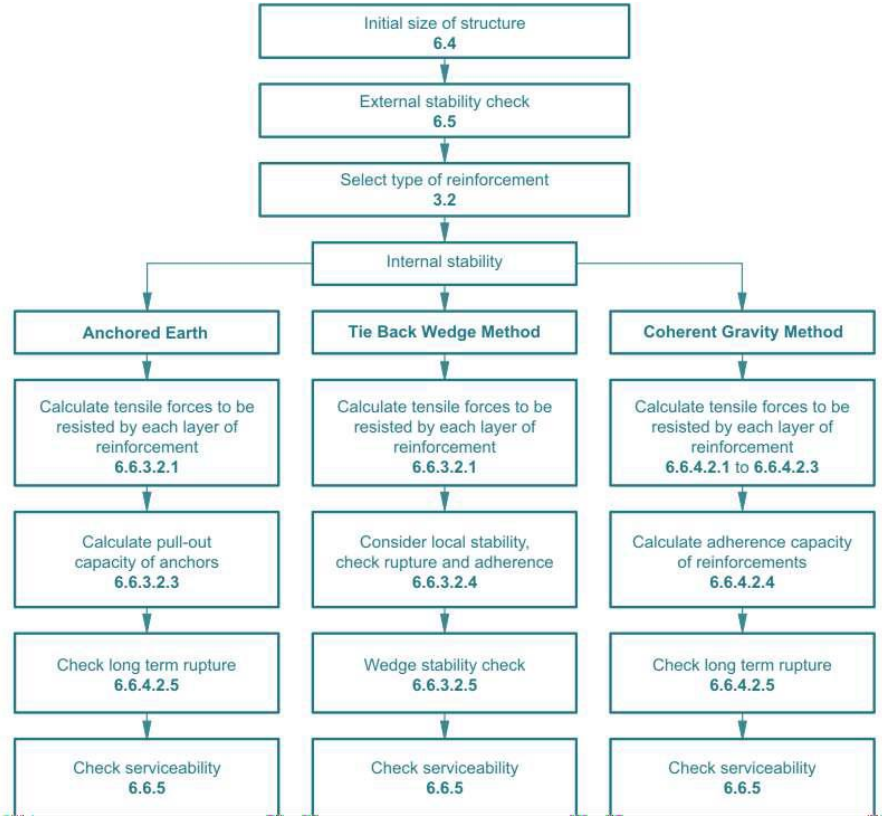
DESIGN METHOD

Back-to-back



Simple

Trapezoidal



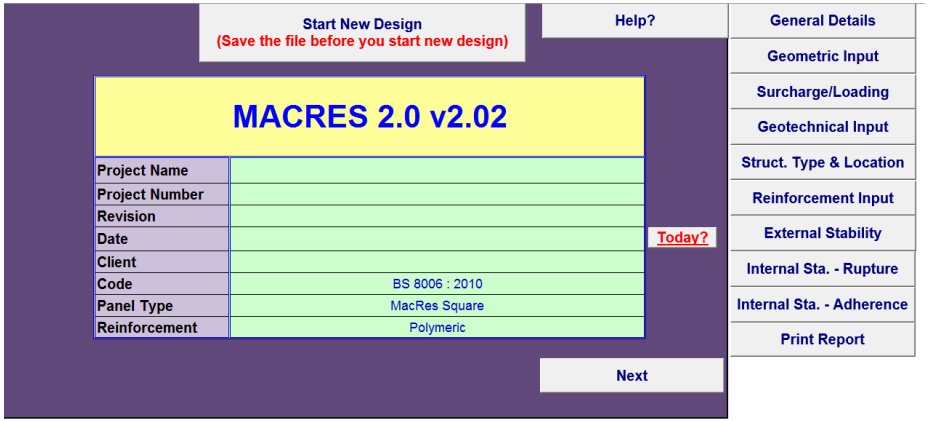
DESIGN METHOD

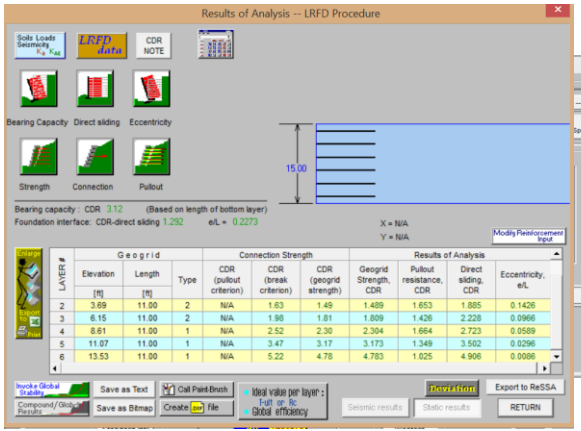
The design load is sustained by the long-term design strength LTDS (Tal = Td) of the reinforcement, which is calculated considering the appropriate RFs for creep, installation damage and durability:

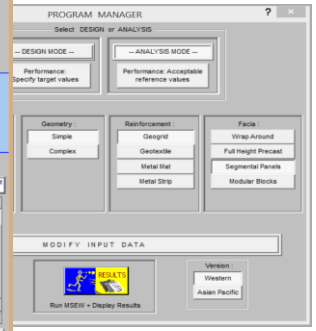
$$T_{al} = T_{ult} / (RF_{cr} \times RF_{id} \times RF_{d})$$

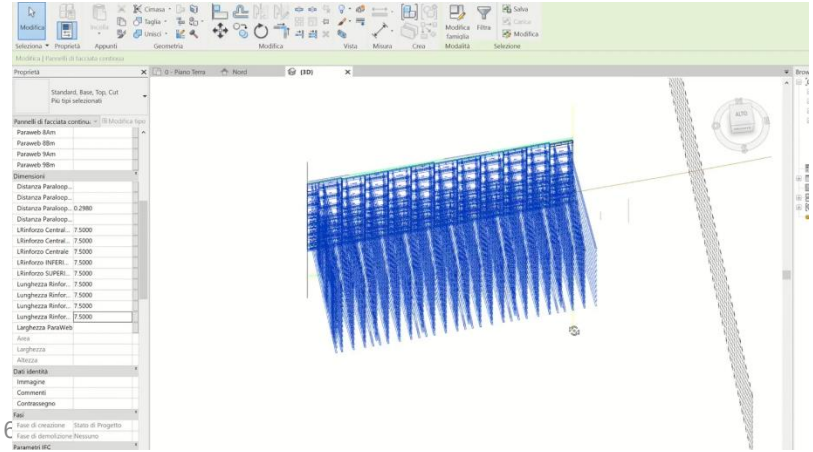
DESIGN AND GRAPHIC SOFTWARE

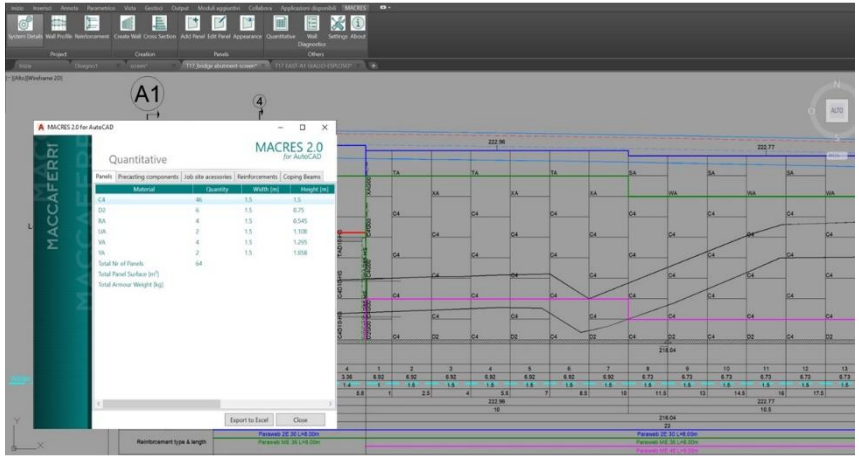
MACCAFERRI











MACRES SYSTEM

Quality with nature

At Maccaferri, our primary commitment is to address environmental, economic, and social aspects with a holistic approach.

The MacRes® system aligns with the Company's vision and has earned certifications from accredited international laboratories, including BBA and NTPEP.

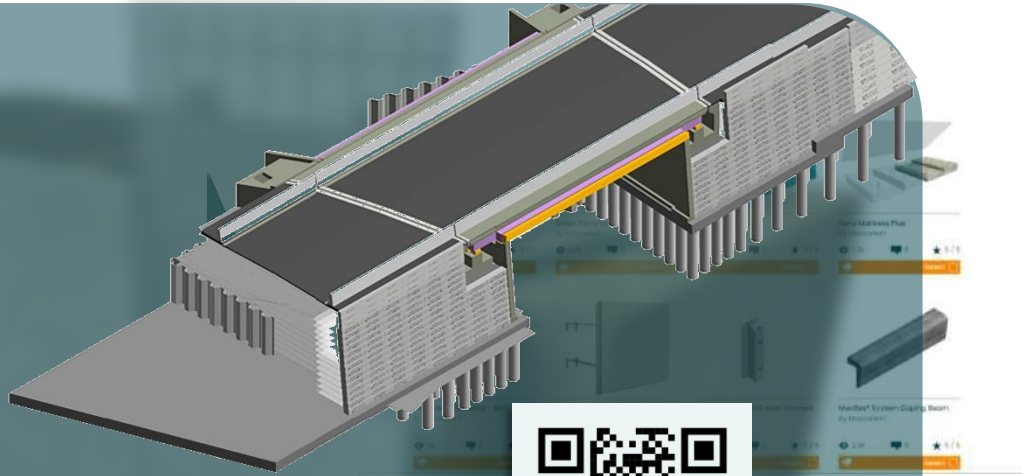
MacRes® system is approved for global use in various applications, from railways to highways, and lime-stabilized backfill to mining crusher walls.

Maccaferri prioritizes environmental sustainability by obtaining the EPD® certification for Paraweb™ products and offering project-specific MacRes® LCA analysis..

DIGITALIZATION PROCESS

MACCAFERRI

Maccaferri values cooperation and actively collaborates with stakeholders, integrating BIM software to assist designers, construction firms, and clients in developing 3D visual plans while ensuring alignment with their product BBA Certificates through the "BIM Object Assurance" service.



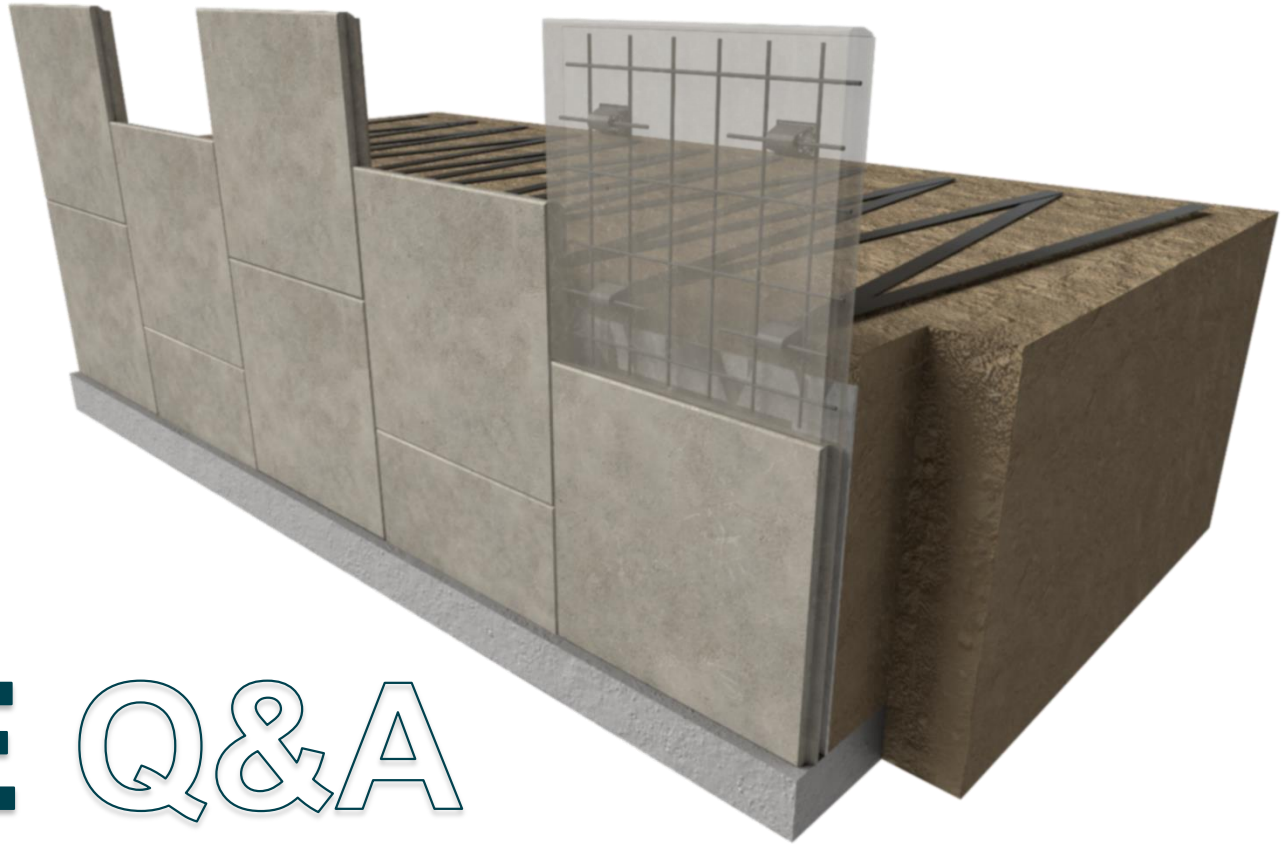
Scan here
and discover our BIM library
or visit maccaferri.com

MACRES SYSTEM

360° Support for your project

Do you need technical assistance?

Our engineers are always here to support you in designing and selecting the most suitable solutions for every type of project.
Type **“technical assistance”** in the chatbox or visit our website at www.maccaferri.com.



LIVE Q&A