METAL·RI

ADVANCED BUILDING SOLUTIONS

Advanced products
and services following
the highest quality standards.

DESIGNING THE PRESENT AND BUILDING THE FUTURE

Metal.Ri was born in 1988 as a small metalworking factory. In 1995, the desire to grow and propose new construction solutions led us to specialise in the design and production of steel-concrete composite structures, with the support of our technical team. Today, the experience we have gained has made us a sure point of reference for technicians and companies operating in the field.

Expertice and technical skills have allowed us to study innovative products aiming more and more to achieve the help we want to provide in the construction sector: the patent of our own construction solution **MTR® System** follows this direction.

INDEX

Designing the present and building the future	1
MTR® System : the innovative choice for an evolved building site	5
What is the MTR® System	6
Advantages: why choose the MTR® system	8
MTR® A beam	10
MTR® A beam in combination with prefabricated slabs	12
MTR® T beam	14
MTR® T beam in combination with prefabricated slabs	16
MTR® C beam	18
MTR® C beam in combination with prefabricated slabs	20
Support systems and structural joints	22
Assembly diagrams and identification tags	24
Special and unusual shape beams	25
MTR® software	26
Regulations and certifications	28
Services: more value to your projects	30
Construction solutions	32
Park cars and commercial buildings	34
Residential construction - Deck type	38
Large spans – both linear and shaped	42
Road, railway and pedestrian bridges	44
Our projects	46

The use of the MTR® System
in combination with
any slab typology
brings to the prefabrication
of the 100% of the horizontal
structures.

SISTEMA
MTR

THE INNOVATIVE CHOICE FOR AN EVOLVED BUILDING SITE

The **MTR® System** is the perfect combination between reliability and innovation in the field of steel-concrete composite structures. Innovative for the morphology, algorithm and calculation software, the system includes three typologies of truss beams and is used to build horizontal structures of any type of construction. Among the steel-concrete composite solutions, the **MTR® Beam** represents the pinnacle in terms of technology and performance, outcome of experimentations and research carried out by the software house **INFO.MTR**, used by **Metal.Ri** to develop, experiment, and produce new technologies.

The **MTR® System** substitutes, totally or partially, the use of primary and secondary beams with that of steel prefabricated composite beams, keeping, however, the building layout of a reinforced concrete structure.

No more in-situ beams, but only steel prefabricated composite beams, directly assembled on the pillars and reinforced at the junctions. Then, the assembly of the slab with its reinforcement and, finally, the casting take place.

Certified building site industrialisation process. Many advantages for: customer, designer and site manager, for "flawless" construction works.

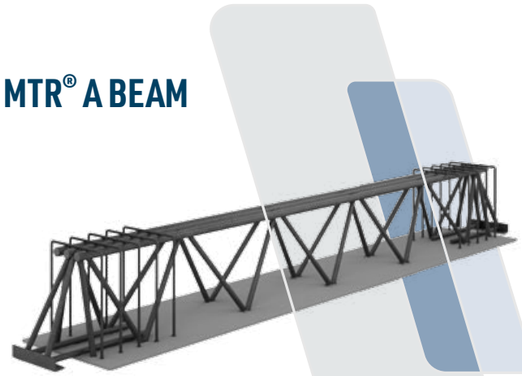
SISTEMA MTR

WHAT IS THE MTR® SYSTEM

The **MTR® System** includes three typologies of trussed beams and the related calculation system for the design.

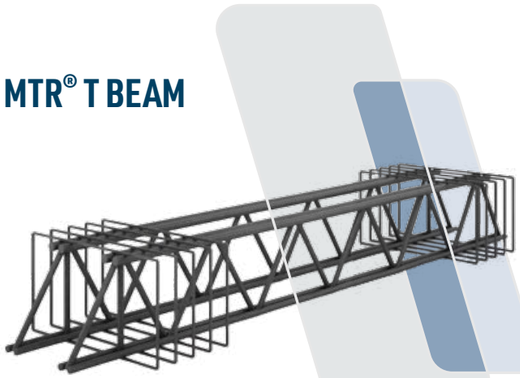
WATCH THE VIDEO

MTR® A BEAM



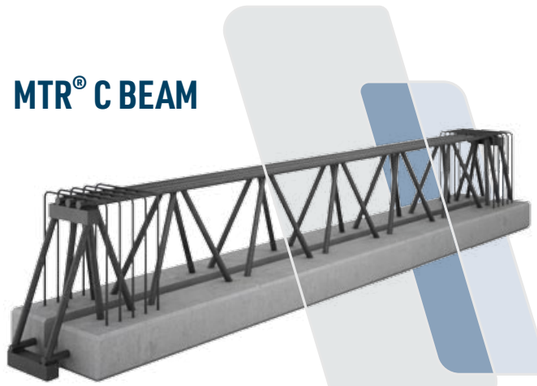
Self-supporting during deck assembly and casting, with steel bottom plate.

MTR® T BEAM



Requires formwork and shoring during deck assembly and casting, without bottom plate and completely embedded in the cast in-situ concrete.

MTR® C BEAM



Self-supporting during deck assembly and casting, with concrete bottom base

INFO.MTR SOFTWARE

SOFTWARE MTR

Software calculation application dedicated to the design of **MTR® beams** and implemented on the specific production process adopted by **Metal.Ri**.

MTR® SYSTEM CHARACTERISTICS

METAL STRUCTURE	Steel in accordance with the EN ISO 10025-2 norm.
COMPLETING CASTING CONCRETE	C25/30 when not otherwise prescribed by the designer.
WELDINGS	Gas-shielded continuous wire feed welding (EN ISO 4063-135 Process) in accordance with European technical standard.
DESIGN	According to calculation procedure of the MTR® Software based on the current standard.
PRODUCT CERTIFICATION	It has CE marking in accordance with the EN 1090-1 norm.

SISTEMA MTR

ADVANTAGES

WHY CHOOSE THE **MTR® SYSTEM**

A wide range of advantages to obtain the best result and satisfy any technical and economical requirement.

1

> RAPIDITY OF EXECUTION

The speed and ease of assembly of the **MTR® System** reduce the costs and times required to build a horizontal structure. According to the typology of **MTR® beam** employed, there are the following reductions of time:

MTR® A BY 70%	**MTR® T BY 50%**	**MTR® C BY 70%**

All the **MTR® beam** typologies are produced in the factory and arrive in the building site ready for the laying. They are not stocked before their assembly.

They are directly transferred from the lorry to the pillars: **less handling, which implies a reduction of costs and times**.

2

> SUSTAINABLE AND ECONOMICAL BALANCE

With the **MTR® System**, there is a decrease in the processing on site, reducing energy consumption and CO_2 emissions. The formwork is considerably decreased with the **MTR® T** beams and completely eliminated with the **MTR® A** and **C** beams. The number of shorings and the use of formwork decreases as follows:

MTR® A BY 100%	**MTR® T BY 60%**	**MTR® C BY 100%**

By reducing or totally eliminating shorings and formwork, the extra costs for the management of a building site are optimised.

3

> SAFETY ON SITE

The prefabrication of horizontal structures with **MTR® beams** improves the safety on site by 60%.

The use of the **MTR® System** in combination with any slab typology leads to 100% prefabrication of the horizontal structure. This total prefabrication guarantees greater safety on sitedriing down risks and complexities related to overhead assembly, typical of traditional reinforced concrete solutions.

4

> PRODUCT GUARANTEE AND EARTHQUAKE RESISTANCE

MTR® beams are produced in the factory and arrive on site ready for the laying. This guarantees a 100% certainty for the customer, the structural designer, and the site manager during the construction phases of the structure. The **MTR®** element that is designed is the same that is produced in the factory, with CE marking, and easily assembled with no need for skilled manpower. Moreover, the **MTR®** technology improves the dimensional ratios within the beams/pillar junction, optimising the reinforcements in the strict respect of the resistances hierarchy.

6

> CONCRETE REDUCTION

The **MTR® Beams** have reduced sections in comparison to the equivalent traditional structures made of reinforced or prestressed concrete, with subsequent reduction of the pillar sections and therefore of the quantity of concrete. With the use of self-supporting **MTR® A** and **MTR® C** beams, the pillars will be even more reduced.

5

> ARCHITECTURAL FREEDOM AND VERSATILITY

The spaces are optimised thanks to hidden beams, the reduction of pillar sections, and the possibility to have wider spans. Therefore, structures will have larger bays than those with traditional beams, structures with perimeter beams within the thickness of the floor as well as architecturally complex structures can be builted. Steel, which can be easily moulded, allows you to shape the **MTR® beams** so as to satisfy any architectural requirement.

7

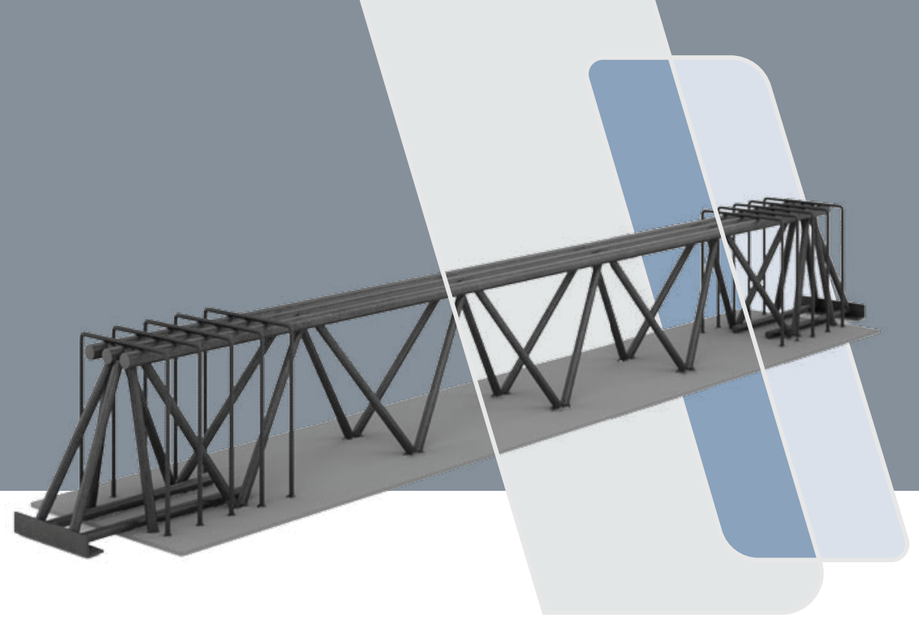
> FIRE RESISTANCE

The steel used for **MTR® beams**, coated or embedded in concrete, ensures the structure resistance in case of fire, with no additional costs or processing.

MTR® C beams are native fire resistant (R);

MTR® T beams become fire resistant (R) if laid on a predalle slab system or on a formwork with the due concrete cover;

MTR® A beams are native fire resistant (R) with additional side steel rods or with bottom base treated with intumescent paints, fireproof plasterboards and coatings.



MTR® A BEAM

SELF SUPPORT, REINFORCEMENT, AND FORMWORK IN A SINGLE ELEMENT

Self-supporting during deck assembly and casting, with steel bottom plate.

The **MTR® A beam**, with steel bottom plate, is self-supporting in the assembly and deck casting phase. It can satisfy any architectural requirement, representing the alternative and ideal solution in comparison to the construction limits that characterise the traditional systems.

It has CE marking in accordance with the EN 1090-1 norm, and it is made up of a bottom plate, top chord, steel cores, metal structure completed during the work by a collaborating concrete casting.

ADVANTAGES OF THE MTR® A BEAM

> Reduction of the construction time of the horizontal structures by 70%.

>Reduction of the number of pillars and their sections.

>Reduction of the beam sections in width and height.

>Reduction of the stress on the pillars.

>Reduction of the concrete for the beams.

>Complete elimination of formwork and shoring.

> Possibility of covering large spans, up to 30 metres, handling light metal elements.

CHARACTERISTICS

BASE	Steel bottom plate in accordance with the EN ISO 10025-2 norm with the function of reinforcement, support for the slab and formwork for the completing casting.
SELF-SUPPORT	The beam supports itself and the slab burdening it from the very moment in which it is laid on the pillar, even before the completing casting.
REGULATORY REFERENCE	• In the First phase Eurocode 3, • In the Second phase Eurocodes 2, 3, and 4, • For designs in seismic zone, Eurocode 8.
MECHANICAL FIRE RESISTANCE	Native fire resistant (R) with additional side steel rods or with bottom plate treated with intumescent paints, fireproof plasterboards and coatings.

TREATMENT AND FINISHES

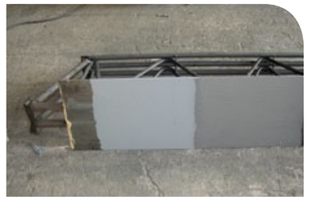
> TREATMENT OF THE BOTTOM PLATE

This treatment is used to protect the steel and to create a surface ready to be plastered. The non-structural laminations for upstand/downstand beams are also treated with the same technique.

The bottom base of the **MTR® A beam** is always treated with anti-rust primer on both sides and gripping resin for plaster only on the rough part to be plastered.

> PAINTING

Anti-rust primer



> PLASTER

Primer + gripping resin

> CORTEN STEEL

On request with bottom plate and lateral containment laminations, particularly suitable for the construction of bridges.

APPLICATIONS

RESIDENTIAL BUILDINGS

COMMERCIAL AND LEISURE BUILDINGS

INDUSTRIAL BUILDINGS

HOSPITALITY BUILDINGS

ROAD, RAILWAY AND PEDESTRIAN BRIDGES

REFURBISHMENT

COMPLEX STRUCTURES AND ARCHITECTURES

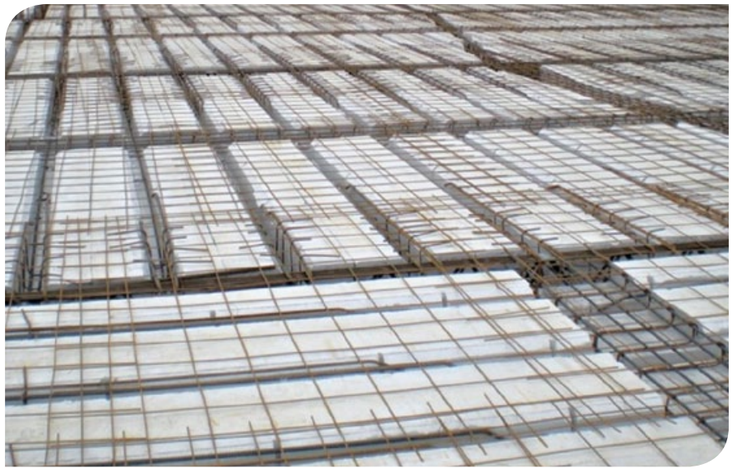
MTR® A BEAMS
IN COMBINATION WITH PREFABRICATED SLABS

Hardy slab, lightened slab, predalles slab, hollow core slab.

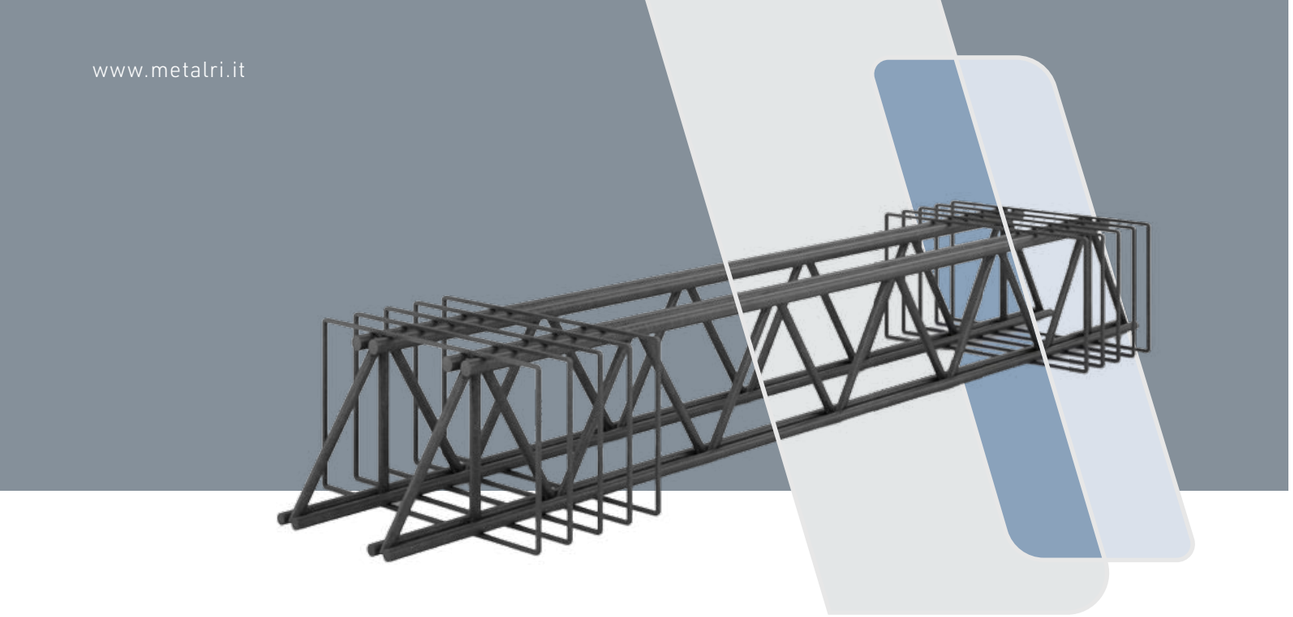
> **MTR® A Beams** with lattice beams and hollow clay bricks lightening slab.

> **MTR® A Beams** with predalles slab within the thickness of the floor.

> **MTR® A Beams** with lattice beam and EPS lightening slab.



> **MTR® A Beams** with EPS panels/blocks and in-situ concrete forming ribs.



MTR® T BEAM

LIGHT PREFABRICATION FOR TRADITIONAL CONSTRUCTION SYSTEMS

Requires formwork and shoring during deck assembly and casting, without bottom plate and completely embedded in the cast in-situ concrete.

The solution that replaces the classical reinforcing bar to be assembled on site, with the advantages of a steel-concrete composite structure: a light prefabrication to combine with the traditional construction systems, both for new buildings and for the refurbishment of existing buildings. The **MTR® T beam** is not self-supporting and must be laid on a formwork or on top of lattice plank as part of predalles system floor.

With **MTR® T elements** it is possible to build hidden beams where the ordinary reinforced concrete does not allow it. It is made up of one or more steel trusses in accordance with the EN ISO 10025-2 and spaced 15 or 25 cm: every single truss is formed with two bars for the top chord and two bars for the bottom chord connected though a lattice element to be completed on site with in-situ concrete to achieve the composite action.

MTR® T Beams can be combined with any type of slab and vertical structure and can be used in the construction of any building where self-support is not essential.

CHARACTERISTICS

REGULATORY REFERENCE	• Par. 4.1, 4.2, and 4.3 NTC 2018 and Eurocodes 2, 3, and 4. • For designs in seismic zone, chap. 7 NTC 2018 and Eurocode 8.
MECHANICAL FIRE RESISTANCE	According to the lower concrete cover and the thickness of the bottom of the lattice plank as part of the predalles floor system on which it rests, the required fire resistance will be achieved.

ADVANTAGES OF THE MTR® T BEAM

> Reduction of the construction time of the horizontal structures by 50%.

> Reduction of the number of pillars and their sections.

> Reduction of the beam sections in width and height.

> Reduction of the formwork.

> Reduction of the concrete for the beams.

> Fire resistance with no extra costs and processing.

APPLICATIONS

RESIDENTIAL BUILDINGS

COMMERCIAL AND LEISURE BUILDINGS

INDUSTRIAL BUILDINGS

CAR PARKS

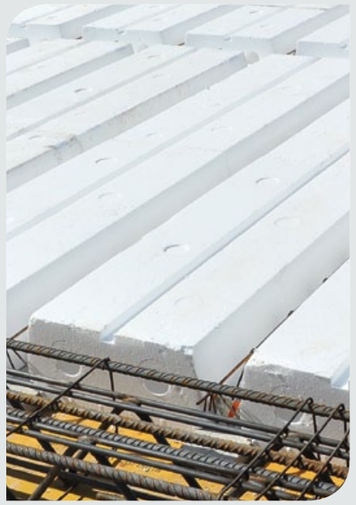
COMPLEX STRUCTURES AND ARCHITECTURES

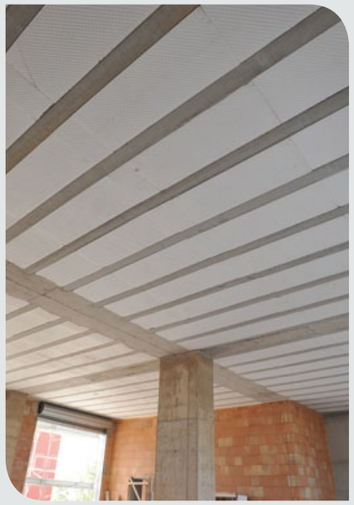
MTR® T BEAMS
IN COMBINATION WITH PREFABRICATED SLABS

Hardy slab, lightened slab, predalles slab.

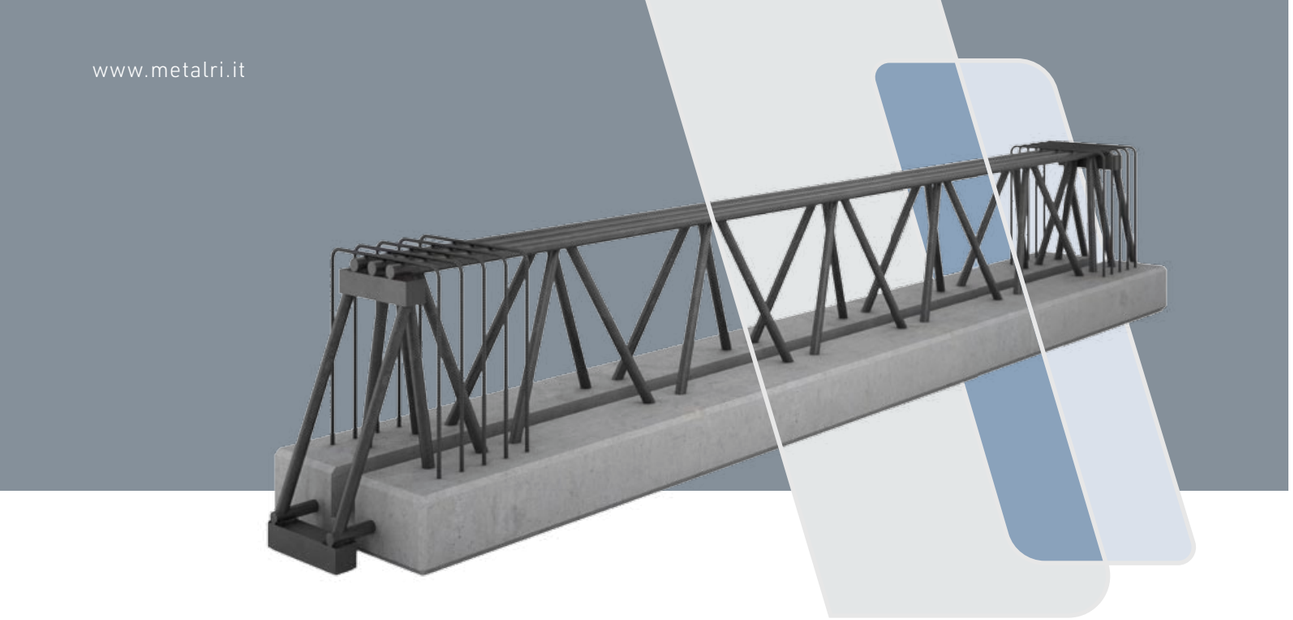
> **MTR® T Beams** with lattice beams and hollow clay bricks lightening slab.

> **MTR® T Beams** on predalles slabs.





> **MTR® T Beams** with lattice beam and EPS lightening slab.



MTR® C BEAM

THE NATIVE FIRE-RESISTANT SOLUTION FOR IMPORTANT LOADS

Self-supporting during deck assembly and casting, with concrete bottom base.

The concrete bottom base is self-supporting during the assembly and deck casting phase and works as formwork and support for the slab. Ideal for the construction of shopping centres, multi-storey car parks, hotels, convention centres, schools, bridges, and industrial buildings.

CE marked in accordance with the EN 1090-1 norm, it is made up of top and bottom chord, in round or square bars, connected through reticular steel cores. The bottom chord are embedded in a concrete footing suitably dimensioned and reinforced.

The **MTR® C beam**, in combination with totally or partially self-supporting slabs, represents a valid alternative to the precompressed prefabricated systems.

CHARACTERISTICS

BASE	Concrete bottom base as formwork and support for the slab.
SELF-SUPPORT	The beam supports itself and the slab burdening it from the very moment in which it is laid on the pillar, even before the completing casting.
REGULATORY REFERENCE	• In the First phase Eurocode 3; • In the Second phase Eurocodes 2, 3, and 4; • For designs in seismic zone Eurocode 8.
MECHANICAL FIRE RESISTANCE	According to the required concrete cover.

ADVANTAGES OF THE MTR® C BEAM

> Reduction of the construction time of the horizontal structures by 70%.

> Reduction of the number of pillars and their sections.

> Reduction of the beam sections in width and height.

> Reduction of the stress on the pillars.

> Reduction of the concrete for the beams.

> Complete elimination of formwork and shoring.

> Fire resistance with no extra costs and processing.

APPLICATIONS

COMMERCIAL AND LEISURE BUILDINGS

INDUSTRIAL BUILDINGS

ROAD, RAILWAY AND PEDESTRIAN BRIDGES

> **MTR® C Beams** for industrial factory workshops with high live loads (20 kN/m²)

MTR® C BEAMS
IN COMBINATION WITH PREFABRICATED SLABS

Predalles slab and hollow core slab.

> **MTR® C Beams** with predalles slabs or hollow core slabs.

SUPPORT SYSTEMS AND STRUCTURAL JOINTS

The design of the beam to column connection provides the structure with a dissipative and ductile behaviour in compliance with the resistances hierarchy criterion of seismic design.

The **MTR® System beams** rest on the vertical load-bearing elements, pillars and walls, through a specific support system which is welded at the ends of the beams and custom-made, in order to both bear the first-phase loads and avoid interference with the starter bars.

The connection of the **MTR® System** elements with the adjacent load-bearing elements, such as continuous beams, pillars and walls, is achieved by adding reinforcing bar through the structural joints.

Once the concrete is cured, the **MTR® System** elements are steel-concrete composite structures, but the beam to column connection is, from a bending point of view, a full-fledged ordinary reinforced concrete section.

The design of the beam to column connection provides the structure with a dissipative and ductile behaviour in compliance with the resistances hierarchy criterion. At the connection nodes there are the links for concrete confinement as per the minimum standards (Eurocodes 2 and 8).

Metal.Ri supplies the joints additional reinforcement suitably packaged for the each beam and for each individual pillar.

www.metalri.it

ASSEMBLY DIAGRAMS AND IDENTIFICATION TAGS

Each delivery is accompanied by assembly diagrams for the installation of the **MTR® Beams** and the relative additional reinforcement. Each **MTR® Beam** is marked with an identification tag that indicates the correct mounting position.

SPECIAL AND UNUSUAL SHAPE BEAMS

The machinability of steel allows the production of **MTR® Beams** in any shape to deliver a practical solution for the construction of more complex structures. Beginning with the architectural form, through the structural calculations, the **MTR®** element will be produced in the workshop exactly as designed it and is then assembled using a simple lifting operation.

MTR® SOFTWARE

THE PLATFORM THAT INTERACTS WITH YOUR CALCULATION SOFTWARE

The MTR® software has been produced by Info.MTR S.r.l., a software house operating in an ISO 9001 certificed quality system, with whom Metal.Ri collaborates to develop, experiment, and produce new technologies.

The construction system of **MTR® beams** is equipped with a structural calculation software specifically produced and designed considering, on the one hand, the production process implemented in the factory in every single production phase, and, on the other hand, the respect of the technical regulations in force in Italy and Europe.

This software was developed with the aim of integrating the different structural calculation softwares available on the national and European market, to design with the support of **MTR®** technology.

Structural designs adopting the **MTR® System** are suitable for any intended use, whether for residential, commercial, leisure or industrial buildings. Request a technical consultation and one of our engineers will become your reference **MTR®** designer, supporting you in any desired task.

The detailed checks on the **MTR®** elements will be performed by the **MTR®** designer who develops the three-dimensional mathematical model for the structure as a whole supported by calculation software that is capable of interacting with the **MTR® software** application.

INFO.MTR SOFTWARE

THIS SOFTWARE APPLICATION HAS BEEN DEVELOPED TO BE INTEGRATED IN THE MAIN CALCULATION SOFTWARES

It allows you to obtain:

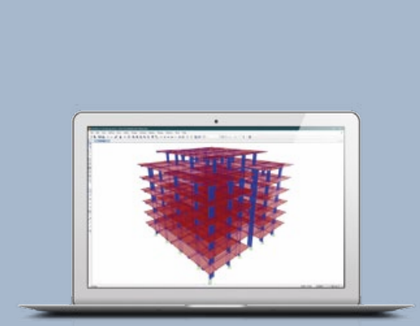
> automated construction processes that transform the project specifications of the prefabricated systems elaborated within the calculation application into industrial productions sheets for the manufacturing workshop;

> industrialised construction processes made in the workshop and certified in accordance with EN ISO 9001 and EN ISO 3834-2;

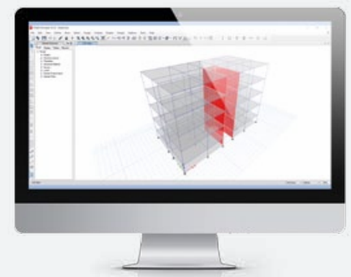
> CE marked products in accordance with EN 1090-1.

This range of products has been equipped with automated design procedures based on the use of calculation models of "proven reliability" (Structural Eurocodes) that represent the "native verticalisation".

SAP 2000

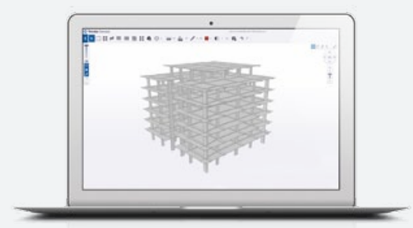


ETABS



AXIS

TEKLA STRUCTURES



SOFTWARE MTR

REGULATIONS AND CERTIFICATIONS

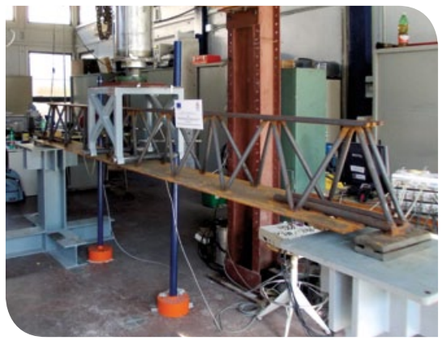
WE INVEST IN RESEARCH TO GUARANTEE THE BEST STANDARDS

Calculation theories of the MTR® System have been experimented in partnership with Politecnico di Bari, Università La Sapienza di Roma, and Università degli Studi della Basilicata.

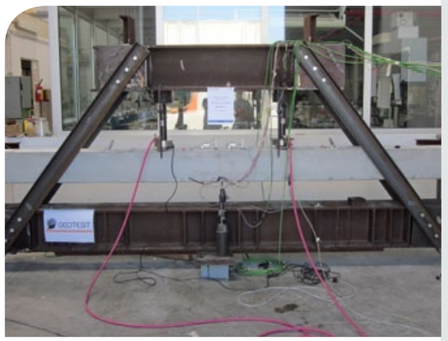
Metal.Ri takes part in working groups and trade associations with which it develops specific projects (Universities, National and International Research Centres).

Together with **INFO.MTR**, It invests in products research and development, in the compliance with European regulations and norms. The purpose is to offer innovative solutions, made with cutting-edge technologies, with controlled and certified quality guarantees.

> Evaluation of the anti-seismic response by means of a 1:1 scale cyclic test of the reinforced concrete pillar, i.e. MTR® Beam



> Static load test on the non-cast MTR® beam Phase 1



> Static load test on the cast MTR® beam Phase 2

> Load test on site

METAL.RI HAS GOT THE FOLLOWING PRODUCT AND SYSTEM CERTIFICATIONS:

CE MARKING

All Metal.Ri products have CE marking in accordance with the EN 1090-1 norm.
The production control in the factory carried out by Metal.Ri satisfies the requirements for the maximum Execution Class EXC4.

QUALIFICATION FOR CATEGORY A

Recognition released by the C.S.LL.PP. (Consiglio Superiore dei Lavori Pubblici, High Council for Public Works) – Central Technical Service, granting the qualification of the MTR® System for category A (Steel-concrete composite beams as set forth in the "Guidelines for the use of steel trussed beams embedded in the collaborating concrete casting and procedures for the release of the authorisation for the usage").

COMPANY QUALITY SYSTEM CERTIFICATION

Metal.Ri has got a Company Quality System certified in accordance to the EN ISO 9001 norm.

WELDING PROCESSES CERTIFICATION

Metal.Ri checks the weldings through a quality management system certified in accordance to the EN ISO 3834-2 norm, recognised at an international level.

PRODUCT AND PRODUCTION PROCESS QUALIFICATIONS

Recognition released by the C.S.LL.PP. - Central Technical Service as Certification as transformation centre No. 2529/13. 2529/13.

EUROPEAN PATENT

Metal.Ri has got a European Patent for the MTR® System issued by the EPO (European Patent Office).

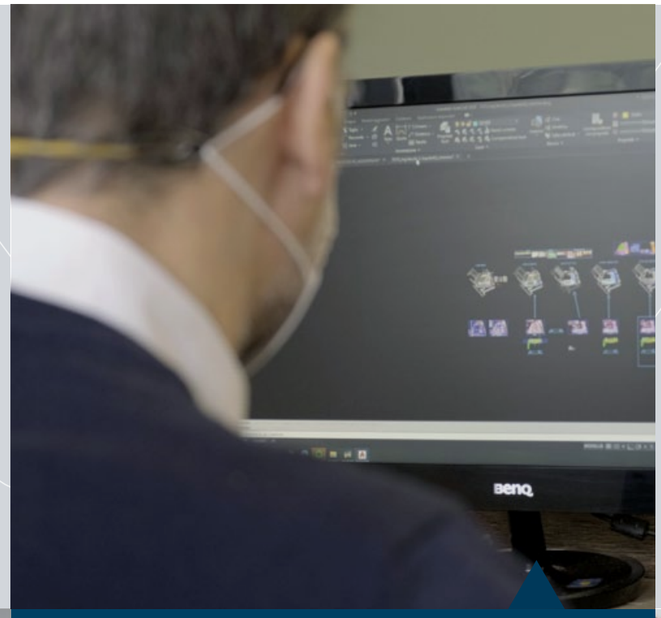
SERVICES

MORE VALUE TO YOUR PROJECTS

Metal.Ri offers its customers full support during all project phases: from the preliminary phases to the implementation on site. **Find out the structural engineering services offered by Metal.Ri**

TECHNICAL CONSULTING DURING THE DESIGN PHASE

We offer free technical consulting: an engineer of our technical team will become your own **MTR®** reference designer, presenting you the best project solution with the **MTR® System**.



MTR® BEAMS PROVISION

The **MTR® beams** will arrive directly at the building site. Our logistic office will assist you, and together you will schedule the delivery.

STRUCTURAL CALCULATIONS EDITING

Metal.Ri's technical office is at your disposal to provide you with assistance during the design of the whole structure, as well as of the **MTR® beams.**

SPECIALISED ASSISTANCE AND SUPERVISION DURING THE ASSEMBLY OF THE MTR® ELEMENTS

Metal.Ri team will be at your disposal for on-site assistance and the erection practices of the **MTR® beams**.

MTR® SYSTEM

CONSTRUCTION SOLUTIONS

A range of possibilities to satisfy any construction requirement

Structural designs with the **MTR® System** can be adapted for any intended use. Each building can be designed and constructed using the technical aspects of a single **MTR® Beam** type or different types. A multitude of possibilities, so you can obtain optimum results and satisfy any technical and economic requirement.

CAR PARKS AND COMMERCIAL BUILDINGS

All MTR® System beams are ideal for the construction of car parks and commercial buildings

Structures used as car parks and commercial buildings require large spaces for manoeuvring and interior layout.

The **MTR® System** allows for the use of less bulky pillars and hidden beams within the thickness of the floor, which also guarantees R 60/90/120/180 fire protection – another essential feature for this type of construction.

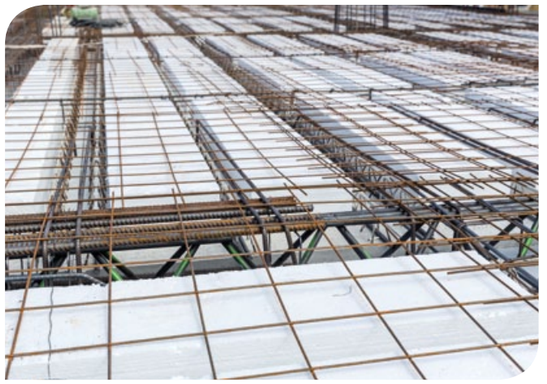
All **MTR® System** beams (**MTR® A**, **MTR® T** and **MTR® C**) are ideal for the construction of car parks and commercial buildings; some of these construction solutions are listed below.

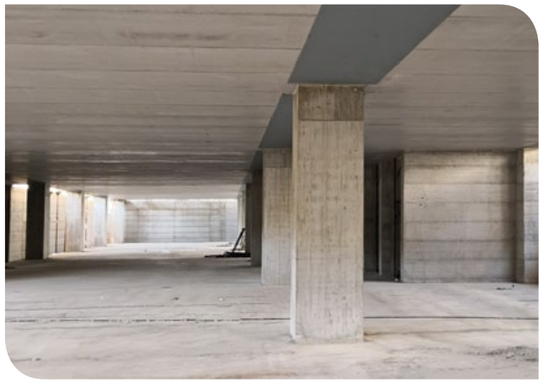
MTR® A BEAM COMBINED WITH PREDALLES SLABS

Thanks to the **complete self-supporting capacity of the MTR® A Beam** combined with a partially self-supporting predalles slabs, it is possible to reduce the moments acting on pillars, whereby a reduction of cross sections is achieved. Self support, reinforcement, and formwork in a single element mean that the **construction time for decks is halved**, and the **expense of shoring is completely eliminated**. The final bilance includes a **reduction in costs for the structure as a whole.**

Keeping consistent the thickness of the floor, the **MTR® A Beam** allows to achieve considerable spans, also guaranteeing R 60/90/120/180 fire protection thanks to the integration of additional reinforcement or coatings/ intumescent paints.

Construction times are halved, and the costs for the structure as a whole are reduced





MTR® T BEAM WITH PREDALLES SLABS

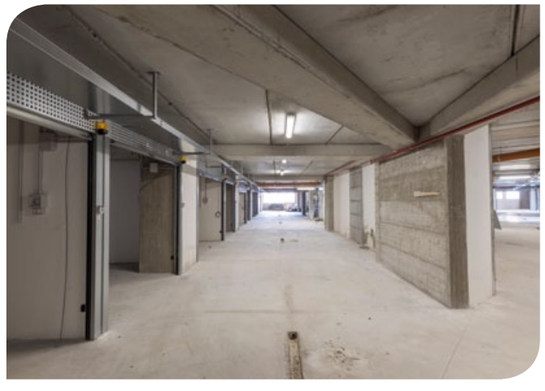
Choosing the **MTR® T Beam** also reduces the time required for building horizontal structures, even though it is not self-supporting. It is still a prefabricated beam **which eliminates the need for the on-site overhead assembly of reinforcement**.

Its nature as a composite steel-concrete beam results in better performance and smaller dimensions than an equivalent beam with mild reinforcement. Finally, by resting directly on the bottom of the predalles slab, it guarantees R 60/90/120/180 fire protection by creating a solid, lightened and uni-directional slab.

MTR® C BEAM COMBINED WITH PREDALLES SLABS OR HOLLOW CORE SLABS

The **MTR® C Beam** works in the same way as the **MTR® A Beam**. It differs in the presence of a reinforced concrete base that is **suitably sized to withstand all first phase loads** and to guarantee R 60/90/120/180 fire protection.

The choice of slab to be combined with the **MTR® C Beams**, as a semi-self-supporting or fully self-supporting hollow core slab, depends on the structural and construction requirements. However, the fact that you can count on the **total self-supporting capacity of the horizontal structures** undoubtedly offers many advantages for the buildings.



RESIDENTIAL CONSTRUCTION DECK TYPE

Reduced construction times and better distribution of internal spaces

The **MTR® System** is widely used in residential construction. There are many reasons why lead designers and companies use the various **MTR® Beam** types, i.e. the need **to build structures within a short time frame**, the need for large structural mesh **to better distribute the interior spaces** and the need **to avoid lowered beams along the perimeter**.

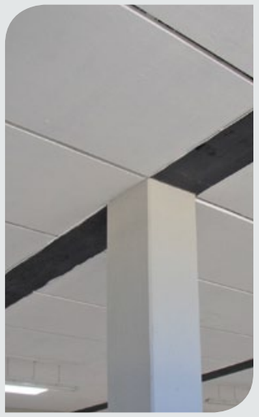
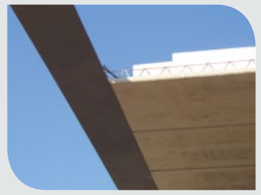
Below are three solutions that **Metal.Ri** proposes for the construction of the type of decking that is typical for residential buildings.

MTR® A BEAM COMBINED WITH A PREDALLES SLABS OR WITH LATTICE BEAMS AND HOLLOW CLAY BRICKS OR EPS LIGHTENING SLABS

Wherever there is a **need to build decks with large structural mesh within a very short time**, without the use of formwork, the **MTR® A Beams** are the perfect choice. The perimeter beams come pre-equipped with permanent metal formwork and all the exposed steel parts will come pre-treated with an adhesion agent for plaster.
Furthermore, the use of self-supporting **MTR® A Beams** is also permitted in combination with projecting parts such as cantilevers. Without doubt, this solution therefore delivers the best performance.







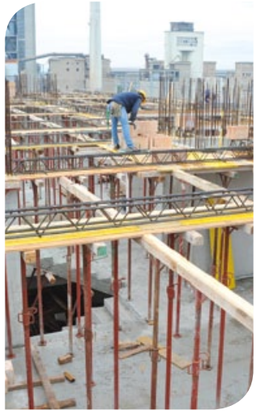


MTR® T BEAM ON FORMWORK COMBINED WITH LATTICE BEAMS AND HOLLOW CLAY BRICKS OR EPS LIGHTENING SLABS

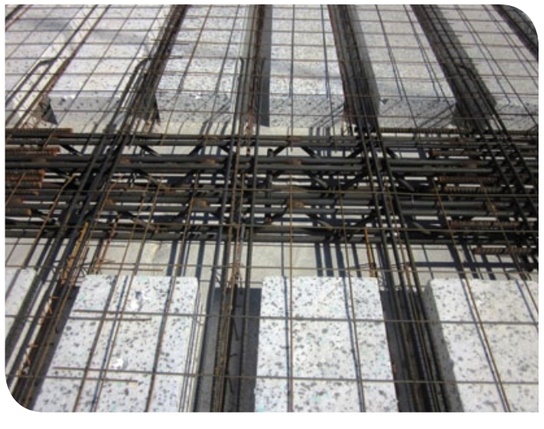
The **MTR® T Beam** represents a form of light prefabrication in the traditional building field, which **completely eliminates the need to overhead assemble reinforcements** on supporting beams. Traditional prefabricated slabs, combined with **MTR® T Beams** that arrive directly on site ready to be assembled overhead, allow for the total prefabrication of the horizontal structure. Compared to an equivalent beam prepared on site, the **MTR® T Beam** with its steel-concrete composite structure will have a **reduced section on both sides and cover more demanding spans**.












MTR® T BEAMS FOR CANTILEVERS AND MTR® A BEAMS FOR THE WHOLE REST OF THE DECK

This third constructive proposal involves the use of both **MTR® T Beams** and **MTR® A Beams**, making the most of their characteristics and thereby optimising costs. This is a hybrid solution that we highly recommend for the construction of residential buildings because it is the most functional.

For cantilevers that usually require total formwork, it is preferable to use **MTR® T Beams, hidden beams and incorporated during the concrete casting.** For the rest of the deck, self-supporting **MTR® A Beams** will be used to **completely eliminate formwork**.




LONG SPANS
BOTH LINEAR AND SHAPED

The ideal alternative to very heavy, prestressed beams or metal structures

Industrial and leisure buildings, shopping centres, places of worship and theatres are characterised by **large internal spaces** that should feature the **smallest possible number of vertical constraints as well as roof beams with long spans** that are not always linear. The **MTR® System** is the ideal solution to these problems.

The **MTR®** element that **Metal.Ri** recommends in these cases is the **MTR® A Beam** for long spans: **formwork, reinforcement and a self-supporting capacity** are encapsulated in a single light element, which can be moved easily. When combined with totally self-supporting floors, **MTR® A Beams** are guaranteed to offer an ideal alternative to very heavy, prestressed beams or metal structures. Another peculiarity of the **MTR® A Beam** is the option to **shape the latticework by adapting it to any type of geometry**, so as to satisfy the most varied architectural whims.

Even for multi-storey structures, with heavy loads, the **MTR® System** is the winning solution. **MTR® A or MTR® C Beams with reduced sections**, completed on site by the installation of joints additional reinforcement to make a wet node (particularly recommended in highly seismic areas) and optionally also supplied R 60/90/120/180 fire protection, are the right choice.

MTR® A BEAM FOR LONG LINE SPANS

MTR® A BEAM FOR LONG, SHAPED/ SPECIAL SPANS

ROAD, RAILWAY AND PEDESTRIAN BRIDGES

Building a suspended structure such as pedestrian, road and rail bridges is one of the **most complex works**. The **MTR® System** simplifies its execution, offering a valid alternative to classic construction systems.

MTR® A or **MTR® C Beams** are recommended for the construction of bridges. Their bottom base, made of steel for **MTR® A** and concrete for **MTR® C Beams**, guarantee a **self-supporting capacity**, which represents a very important advantage for these types of structures. The use of Corten steel for **MTR® A Beams** guarantees **durability over time**, counteracting the effects of atmospheric phenomena and external agents.

MTR® A BEAM MADE OF CORTEN STEEL FOR A PEDESTRIAN BRIDGE

MTR® A ARCHED BEAM FOR DOUBLING A RAILWAY BRIDGE

MTR® A BEAM MADE OF CORTEN STEEL FOR A ROAD BRIDGE

MTR® C BEAM FOR A ROAD BRIDGE

OUR PROJECTS

Over 25 years of activity in the field of steel-concrete composite structures, and millions of square metres of work completed in all the construction sectors, from residential to commercial, from industrial to leisure and hospitality buildings.

- RESIDENTIAL BUILDINGS
- COMMERCIAL AND LEISURE BUILDINGS
- INDUSTRIAL BUILDINGS
- HOSPITALITY BUILDINGS
- CAR PARKS
- ROAD, RAILWAY AND PEDESTRIAN BRIDGES
- REFURBISHMENT
- COMPLEX STRUCTURES AND ARCHITECTURES

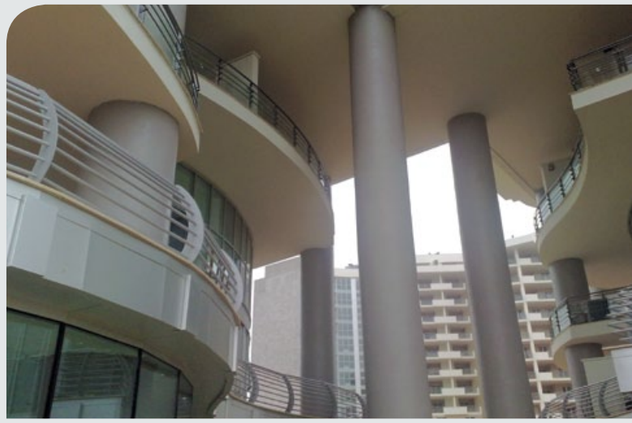
> 2017 | Residential building constructed using **MTR® T**

> **1** e **2** | 2020 | Residential building constructed using **MTR® T**

1

2

3



4

5

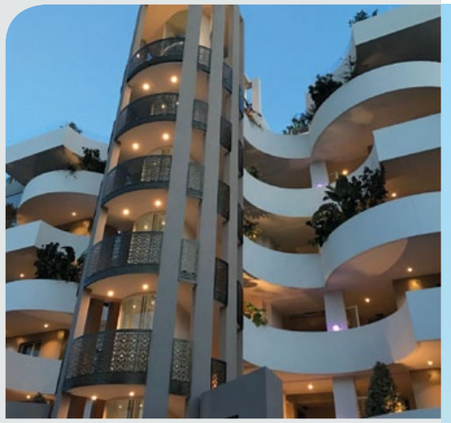
> **1** e **2** | 2018 | Residential building constructed using **MTR® T**

> **3** e **4** | 2009 | Residential building constructed using **MTR® T**

> **5** | 2015 | Residential building constructed using **MTR® T**

1

2



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4

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> **1** | 2011 | Residential building constructed using **MTR® T**

> **2** | 2018 | Residential building constructed using **MTR® T**

> **3** | 2010 | Residential building constructed using **MTR® T**

> **4** | 2009 | Residential building constructed using **MTR® A**

> **5** | 2011 | Residential building constructed using **MTR® A** and **T beam**

1

> 2010 | Car park constructed using **MTR® C**

> 2008 | Commercial building constructed using **MTR® A**

1

2

> **1** | 2006 | Hospitality building constructed using **MTR® A**

> **2** | 2017 | Commercial building constructed using **MTR® A** and **C**

3

> **3** | 2006 | Hospitality building constructed using **MTR® A** with wide spans

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METAL.RI S.r.l.

Via Giuseppe Abbruzzese, 42
70020 • Bitetto (BA) • Italia
T +39 080 9921197
tecnica@metalri.it

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www.metalri.it