Vision and Design

TRAM 34 is a project aiming to produce a contemporary, reliable, in compliant with european standards and new generation light rail system vehicle for Istanbul. As Metro Istanbul, our long years of knowledge and experience in operation, maintenance and design are the basis for the success of the project in design and production processes.

In line with our goal of providing an excellent travel experience, we have conducted meetings with our operations and maintenance staff by analyzing passenger feedback. We have reflected the ideas, which obtained by identifying expectations and needs, to the product as innovation.ns. These innovations have resulted in significant progress in design and product quality.

With concepts that reflect different design approaches in project work; we have developed alternative ideas that reflect innovative, permanent, assertive and strong design lines.

We created concept design proposals using sketches and 3D models. We evaluated suggestions that shed light on the future, reflected functional, innovative, and resolute design philosophy.

By conducting various examinations and analyses, particularly in engineering, we presented development recommendations for the prominent models that aligned with our design strategy and visual identity expectations.

The concept design chosen after the project presentation reflects not only the universal stance and multicultural inclusive values of Istanbul but also a universal product identity.

As Metro Istanbul, we supported the design with concepts and discourses that will define our future vision.

TRAM34

ISTANBUL METROPOLITAN MUNICIPALITY

METRO İSTANBUL

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www.metro.istanbul

Head Office
Address: Yavuz Selim Mahallesi
Metro Sokak No: 3 Esenler/İstanbul

TRAM34

A BRAND NEW METRO İSTANBUL PRODUCT
WITH 100% TURKISH ENGINEERING AND DESIGN

TRAM34

How thankful İstanbul is
How thankful Türkiye is...

ISTANBUL METROPOLITAN MUNICIPALITY

METRO İSTANBUL

Features

We designed the TRAM34 project as a part of the urban public transportation system. The project is designed with features that allow the vehicle to be used as a tram within the city, as well as a light metro with higher passenger capacity for similar purposes. The vehicle meets the requirements of comfort, stability, and safety for both uses. With its dual-functionality, defined as bi-directional usage, its design language incorporates visual codes that can express both concepts. In this sense, the vehicle's wide windows and doors, which provide an enjoyable ride experience, also serve the dual function.

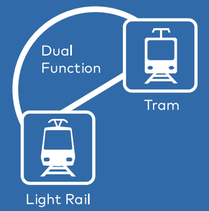
The vehicle has three bogies, two of which are powered and one is carrying (non-powered). The powered bogies are equipped with electric motors and directly connected under the wagons. The non-powered carrying bogie is connected to the articulated joint located between the wagons.

The electric motors not only provide acceleration for the vehicle but can also be used for electrodynamic braking. With this feature, the vehicle is able to return the regenerated energy from braking back to the catenary line as electrical energy.

The vehicle has a fully equipped driver's cab at one side and at other side an openable driver's desk, which allows for driving in emergency situations. This provides the capability for the vehicle to operate in both single and multiple unit configurations in both directions. All driving functions of the vehicle are automatically controlled by the onboard computer.

The vehicle is equipped with a "Fault Detection System" that can identify any potential issues, allowing them to be resolved quickly and safely.

TRAM34 has been designed to operate in different combinations according to the needs of the operation. By connecting the vehicles to each other, a two-car, three-car, or four-car train series can be formed. The vehicle is equipped with four electric passenger doors on each side, which have obstacle detection systems. In the event of detecting passenger congestion, the door opens automatically in a safe manner.



Qualifications

- It is versatile and can operate at various speeds in different sections of the city, including divided roads or surface streets.
- It is an environmentally friendly vehicle with zero emissions in urban areas.
- It is much safer compared to road transportation.
- Its flexible and modular structure allows for adaptation to different conditions and images.
- It offers flexible solutions by being able to go underground or on the surface.
- It can be adapted to different inclines and curves.
- It operates silently and without vibrations.
- It provides high driving and travel quality with its comfort.
- It has a high passenger capacity.

Innovations

Dual-functionality
Unique design that harmonizes with the cityscape
Interchangeable cup concept
Innovative seats and high-quality fabrics
Fast passenger circulation
Panoramic dual driver and passenger windows
New functional driver cockpit
Expanded intercarriage passages
Automatic air ventilation adjustment
Belt-type LED lighting
Impact-absorbing bumpers
Integrated information system
Ergonomic passenger information displays
Driver mirror cameras
Fire detection system
Vehicle automatic control system
Equipment compliant with European standards
Design focused on ease of maintenance
High-quality material

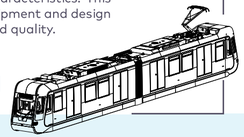
Design Identity

The design presents a combination of rational and technological design approach, showcasing a timeless and confident design language. It promises a design approach that shares Istanbul's dynamic and innovative identity, embracing its technological and cultural depth.

The design language features a clean and clear geometry. It evokes comfort, high technology, and a sense of security while emphasizing its core function. The iconic design language is memorable and captivating, conveying a competitive and liberating image.

With a focus on the passenger and the journey, the design symbolically encompasses the passenger area as a frame of light.

The concept of the vehicle represents a high-tech and robust image with a quality appearance. We aimed to create a sense of power with its characteristics. This power signifies the use of proven equipment and design solutions to enhance performance and quality.



Engineering Design

With the TRAM34 project, we are offering solutions that satisfy our passengers and customers both technologically and technically, while considering the increasing demand for urban rail transportation systems in cities.

In the scope of the project, we have gone through the following main stages:

Industrial Design
Engineering Design and Analysis
Prototype and Pre-Production Manufacturing
Manufacturing Engineering
Engineering and Functional Testing
Mass Production

Throughout the design and production stages of the TRAM34 project, we have involved numerous brilliant minds from various departments, including mechanical, electronic, electrical, and software engineering, among other specialized fields. We have conducted complex and specialized R&D and engineering work in the design, modeling, analysis, manufacturing, control, and testing processes of the vehicle.

Concept design
Preliminary design analysis
System design and component selections
Equipment layout
Detailed design and analysis
3D CAD design
Body design
Bogie design
Structural analysis
Stability and comfort analysis
Electrical system design
Circuit designs
Vehicle control system software
Performance calculations
Material analysis
Weight analysis
Technical drawings

Technical Data

General Information

Vehicle type	Dual-Function Tramway
Model	Single cab, two-way drive
Configuration	2 modules, single articulated
Train set	2, 3, and 4 units in series
Rail type	Ri59,S49

Dimensions

Vehicle length articulated	24,8 m
Vehicle length	25,4 m
Between bogie centers	8,5 m
Vehicle width	2650 mm
Rayd height from rail to roof highest rooftop equipment from the rail	3535 mm 3860 mm
Railway door threshold height	920 mm
Wheel diameter (new/worn)	680 mm/600 mm

Curve and Gradient Information

Minimum vertical curve radius min.	30 m
Horizontal curve radius	300 m
Maximum gradient	%6
Track gauge	1435 mm
Axle design load	11 t
Buffer compression load	400 kN
Seated passenger	166
Standing passenger (8 passengers/m²)	213
Total capacity (6 passengers/m²)	268

Performance

Max. operating speed	80 km/s
Min. deceleration rate (4 passengers/m²)	1,20 m/s2
Min. emergency braking distance (6 passengers/m²)	2,8 m/s2

Traction Power

4 units of 3-phase asynchronous	1 unit of carrier bogie
Motors	Regenerative
Motor power	4x 120 kW

Brake and suspension

Electro-dynamic service brake (ED)	Regenerative Disc Brake
Magnetic brake (MG) service	WSP
Automatic service brake	ED+EH+WSP

Passenger Compartment

Height from floor to ceiling	2270 mm
Corridor width	650 mm
Platform gap width	1511 mm
Electric doors	4 doors in each side
Door entrance height	2000 mm
Door entrance width	1400 mm
Emergency braking	ED+EH+MG+WSP
Secondary suspension	Airbag

Energy System

Nominal line voltage	750 VDC
Low voltage	24 VDC

Functional Features

CPU-based vehicle control system
Integrated information system
Passenger and train driver cabin air conditioning
Driver cockpit with seat-controlled operation
Fire detection system