HEALTHCARE FACILITY LIFELINES RESILIENCE

HEALTHCARE FACILITY

İSTANBUL SEISMIC RISK MITIGATION and EMERGENCY PREPAREDNESS PROJECT (İSMEP)

T.C. İSTANBUL VALİLİĞİ

T.C. İSTANBUL VALİLİĞİ
İPKB
İSTANBUL PROJE KOORDİNASYON BİRİMİ

IPCU

T.C. İSTANBUL VALİLİĞİ

T.C. İSTANBUL VALİLİĞİ
IPKB
İSTANBUL PROJE KOORDİNASYON BİRİMİ

Country / Region	:	Turkey / Istanbul
Project Duration	:	2006 - 2025
Implementation	:	Istanbul Governorship Istanbul Project Coordination Unit (IPCU)
Finance	:	World Bank European Investment Bank Council of Europe Development Bank Islamic Development Bank German Development Bank (KfW) Asian Infrastructure Investment Bank Eco Trade and Development Bank
Loan Amount	:	EURO 2.4 Billion

IPCU

T.C. İSTANBUL VALİLİĞİ

T.C. İSTANBUL VALİLİĞİ
IPKB
İSTANBUL PROJE KOORDİNASYON BİRİMİ

is

an expertise unit that

established under İstanbul Governorship,

out of general bugdet,

funded by International Funding Institutions,

implements earthquake preparedness activities in coordination with related agencies.

HOSPITALS

Ümraniye Pediatric Hospital

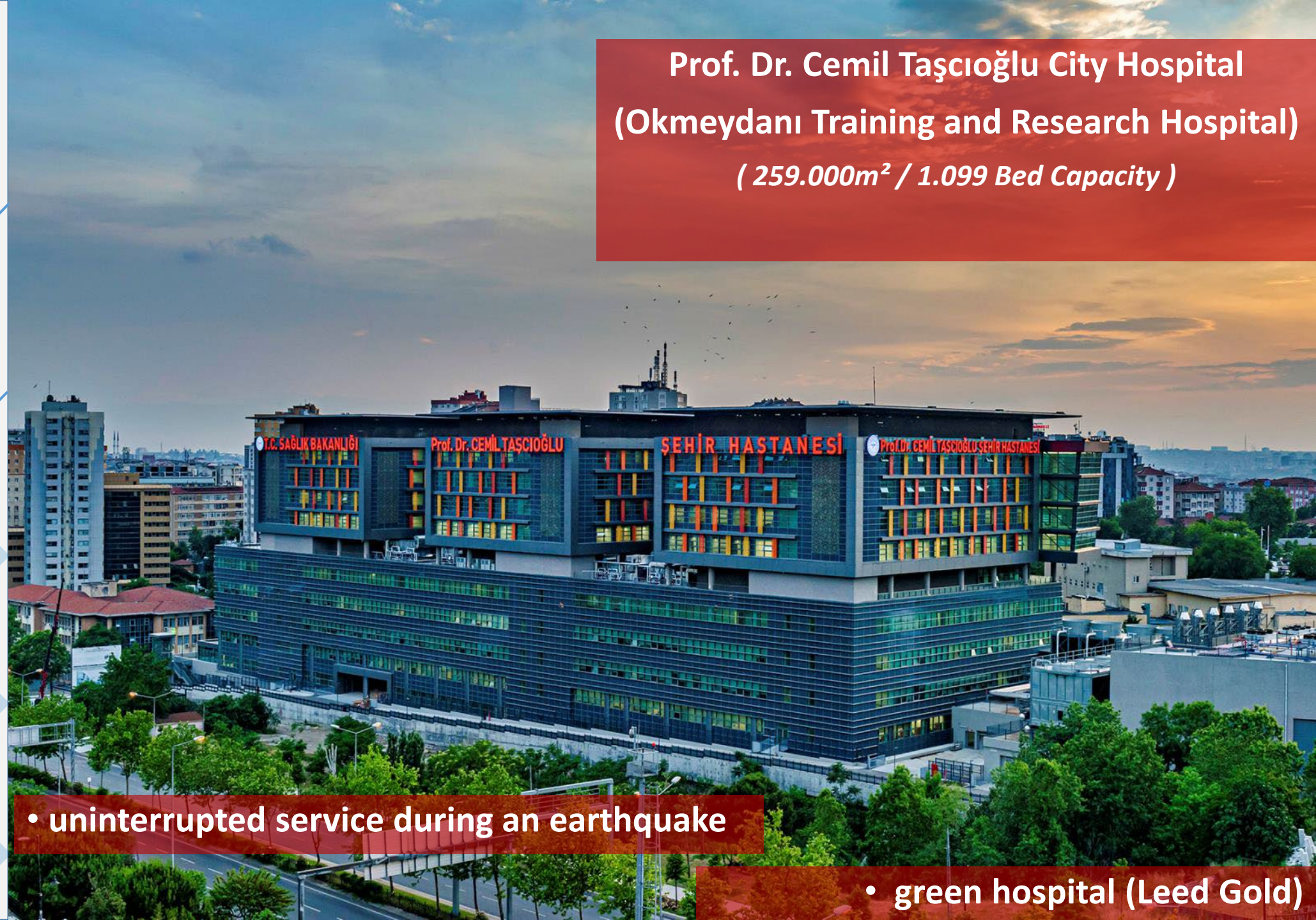
(100.000m² / 477 Bed Capacity)

Ümraniye Pediatric Hospital

HOSPITALS

Ümraniye Pediatric Hospital

HOSPITALS



Prof. Dr. Cemil Taşcıoğlu City Hospital
(Okmeydanı Training and Research Hospital)

(259.000m² / 1.099 Bed Capacity)

- uninterrupted service during an earthquake
- green hospital (Leed Gold)

HOSPITALS

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Prof. Dr. Cemil Taşcıoğlu City Hospital

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Prof. Dr. Cemil Taşcıoğlu City Hospital

HOSPITALS

Kartal Dr. Lütfi Kırdar City Hospital

(303.000m² / 1.105 Bed Capacity)

- uninterrupted service during an earthquake
- green hospital (Leed Gold)&(EDGE)

HOSPITALS

Kartal Dr. Lütfi Kırdar City Hospital

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HOSPITALS

KARTAL DR. LÜTFİ KIRDAR ŞEHİR HASTANESİ

Istanbul, Turkey

HAS FULFILLED THE REQUIREMENTS OF THE LEED GREEN BUILDING RATING SYSTEM CERTIFICATION ESTABLISHED BY THE U.S. GREEN BUILDING COUNCIL AND VERIFIED BY GREEN BUSINESS CERTIFICATION INC.

LEED 2009
HEALTHCARE

GOLD

June 2020

MAHESH RAMANUJAM, PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL,
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.

HOSPITALS

THIS CERTIFIES THAT
Kartal Hastanesi
HAS ACHIEVED AN
EDGE CERTIFICATE
CERTIFICATE NUMBER
GP1-TUR-17072510009748

Exemplifying achievement in the following areas:

32%
Energy Savings

21%
Water Savings

26%
Less Embodied Energy in Materials

6433.03 tCO_2/year
Operational CO_2 Emissions

2,010.54 tCO_2/year
Operational CO_2 Savings

Excellence In Design For Greater Efficiencies
Edge

DEVELOPED BY
Istanbul Governorship, Istanbul Project Coordination

CERTIFIED BY
thinkstep-SGS

Thomas Saunders, EDGE Program Director
DATE OF ISSUE: 01-APR-2019

WORLD BANK GROUP
THE WORLD BANK IBRD • IDA
IFC International Finance Corporation

thinkstep

Excellence In Design For Greater Efficiencies
Edge

THIS CERTIFIES THAT
Kartal Hastanesi
Cevizli Mah, Semsi Denizer Cad, Cevizli Mevkii
34890, Kartal
Istanbul, 34890
Turkey

DEVELOPED BY
Istanbul Governorship, Istanbul Project Coordination Unit (IPCU)

HAS ACHIEVED AN
EDGE CERTIFICATE

CERTIFICATE NUMBER
GP1-TUR-17072510009748

WAS AUDITED BY
Angel Rodriguez
EDGE Software Version: v2.1.5

CERTIFIED BY
thinkstep-SGS

Thomas Saunders, EDGE Program Director

thinkstep

DATE OF ISSUE
01-APR-2019

ENERGY MEASURES
Insulation of Roof
Insulation of External Walls
Higher Thermal Performance Glass
Air Conditioning with Water Cooled Chiller
Variable Speed Drives in AHU
Variable Speed Drives Pumps
Sensible Heat Recovery from Exhaust Air
High Efficiency Boiler for Water Heating
Preheat Water using Waste Heat from the Generator
Energy-Saving Light Bulbs- Internal Spaces (Except OT)
Solar Hot Water Collectors

WATER MEASURES
Low-Flow Faucets in All Bathrooms
Dual Flush for Water Closets in All Bathrooms
Water Efficient Landscaping

MATERIALS
Floor Slabs - In-Situ Reinforced Concrete Slab
Roof Construction - Aluminium Sheets on Steel Rafters
External Walls - Autoclaved Aerated Concrete Blocks
External Walls - Curtain Walling (Opaque Element)
Internal Walls - Autoclaved Aerated Concrete Blocks
Internal Walls - Plasterboards on Metal Studs with Insulation
Flooring - Vinyl Flooring

www.edgebuildings.com

The EDGE standard requires 20% efficiencies in energy, water and materials compared to a local benchmark. Predicted efficiencies are not a guarantee of future operational performance. Energy savings may be associated with virtual energy for comfort depending on the presence of heating and cooling systems. Virtual energy does not contribute savings to utility bills.

This certificate is issued by the Certifier based on information provided by the client and the audit by the Auditor, and is subject to the terms and conditions of the Certifier. Contact edge@ifc.org if the above measures are not consistent with your observation on the project.

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HOSPITALS

Prof. Dr. Süleyman Yalçın City Hospital
(Göztepe Training and Research Hospital)

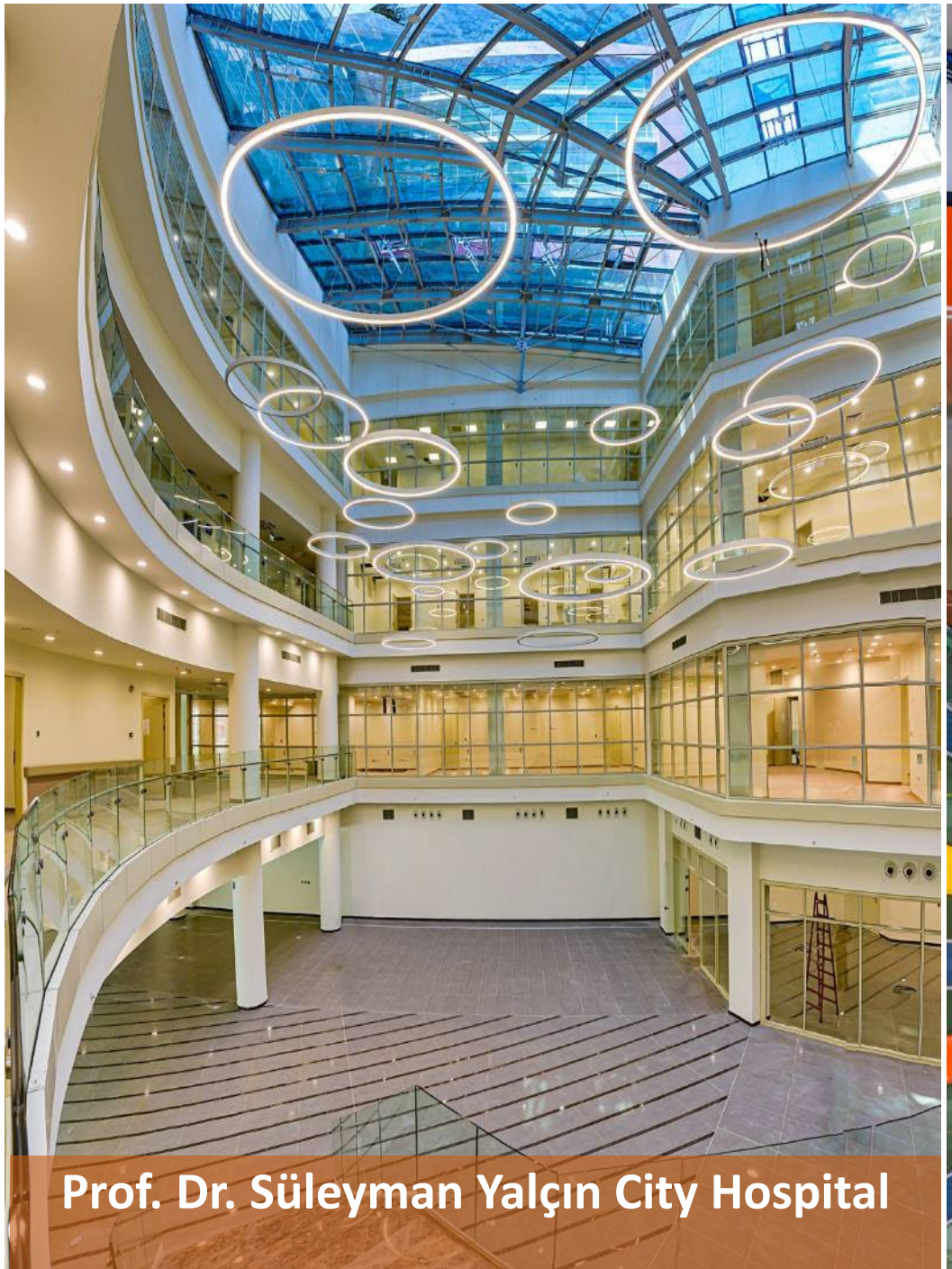
(259.000m² / 1.188 Bed Capacity)

- uninterrupted service during an earthquake
- green hospital (Leed Gold)

HOSPITALS

Prof. Dr. Süleyman Yalçın City Hospital

HOSPITALS



Prof. Dr. Süleyman Yalçın City Hospital

HOSPITALS

Prof. Dr. Süleyman Yalçın City Hospital

HOSPITALS

Prof.Dr. Asaf Ataseven Hospital

(Marmara Başıbüyük Training and Research Hospital)

(113.000m² / 750 Bed Capacity)

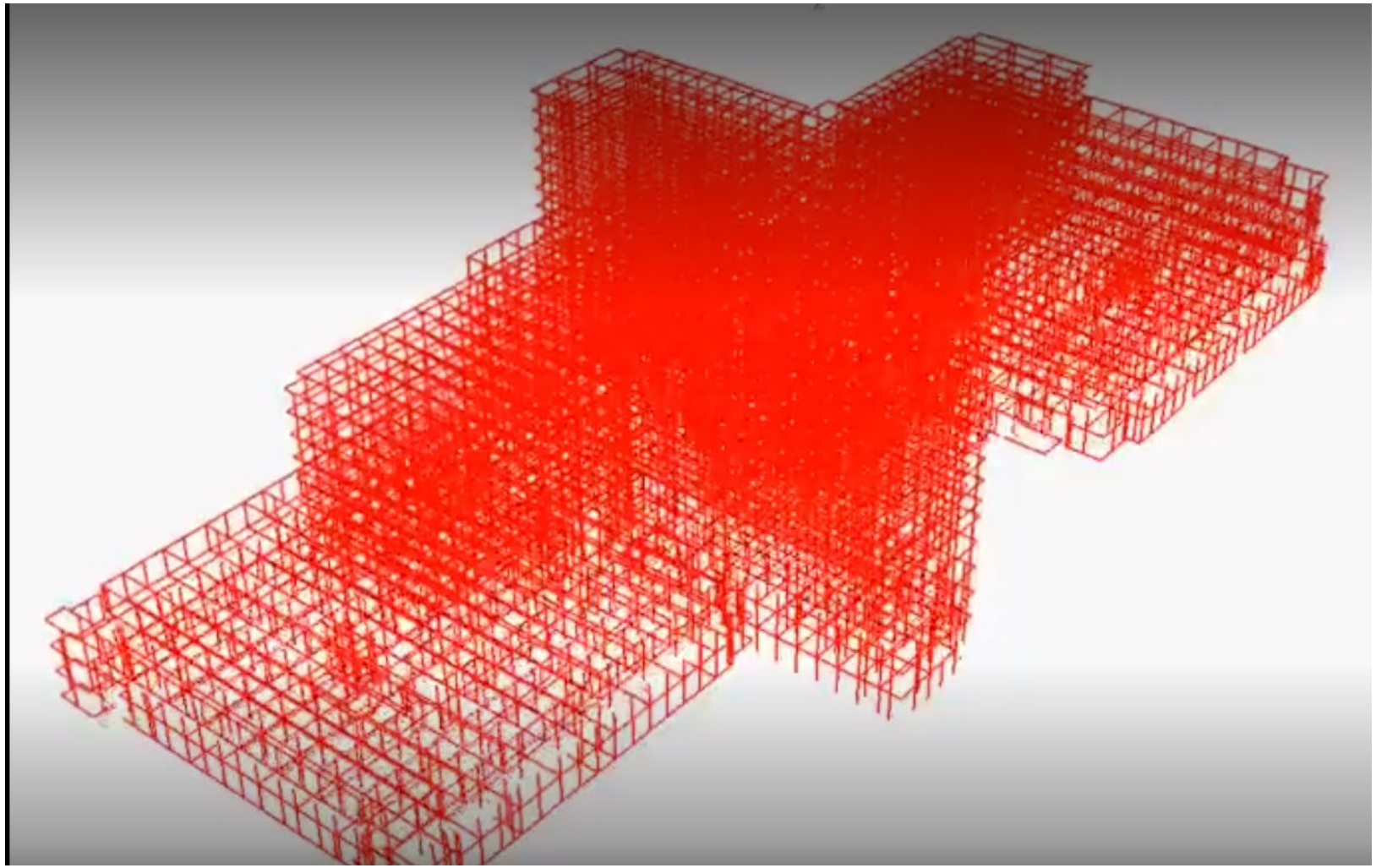
- uninterrupted service during an earthquake

HOSPITALS

Prof.Dr. Asaf Ataseven Hospital

HOSPITALS

Hospital design was completed with the aid of computerized simulations.



ISOLATORS

Simulation demonstrated that base isolation systems reduce vulnerability of hospital buildings.

ISOLATORS

BASE ISOLATION SYSTEM

- A base isolation system is **a method of seismic protection where the structure (superstructure) is separated from the base (foundation or substructure)**. By separating the structure from its base the amount of energy that is transferred to the superstructure during an earthquake is reduced significantly.

- Three major hospitals (Okmeydanı, Göztepe and Kartal) built by IPCU have been completed with base isolation system. (Also Başıbüyük is the largest building ever which has been implemented with base isolators)

- With the development of building technology, base isolation system has also been widespread in many countries, which not only makes buildings stand against an earthquake as well as ensures the buildings to run an uninterrupted service and operation.

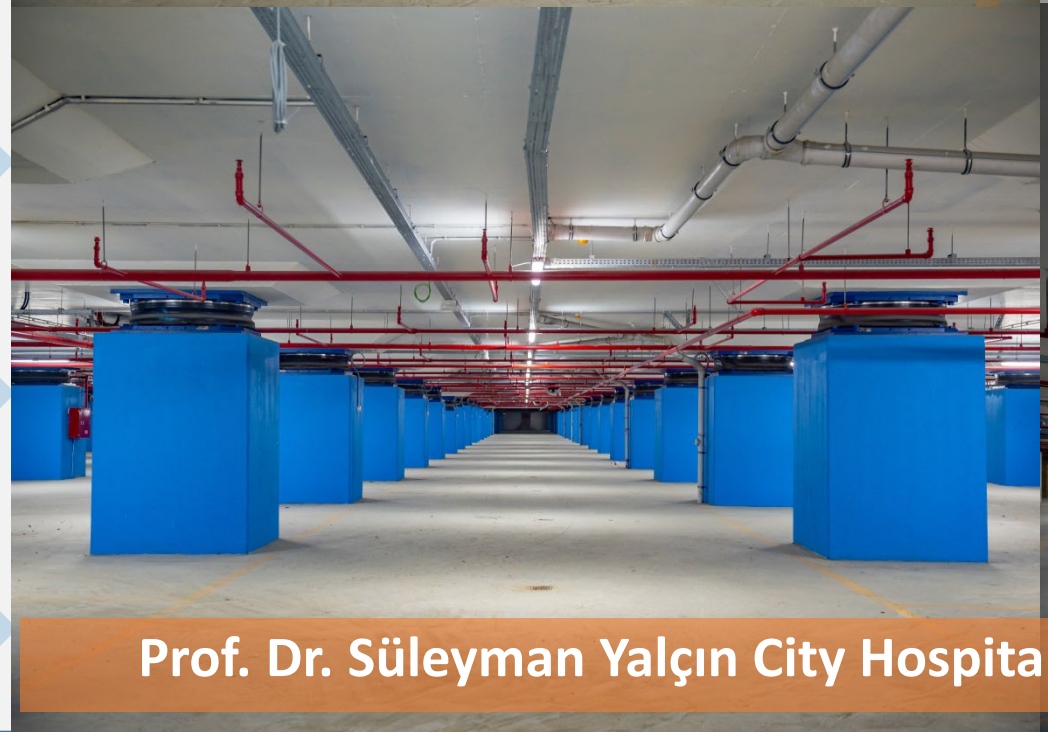
- Therefore base isolation system must certainly be considered in hospital design.

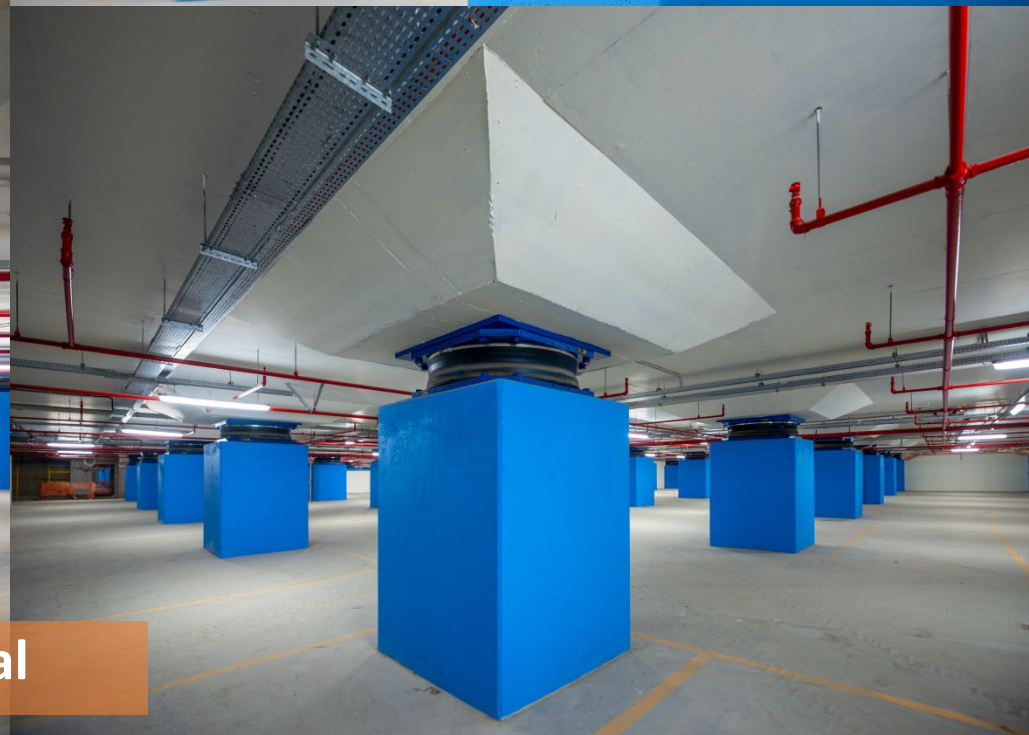
ISOLATORS

Kartal Dr. Lütfi Kırdar City Hospital

ISOLATORS

Prof. Dr. Cemil Taşcıoğlu City Hospital





Prof. Dr. Süleyman Yalçın City Hospital

EQUIPMENT PROTECTION

Restrained Spring Isolator for Seismic Control

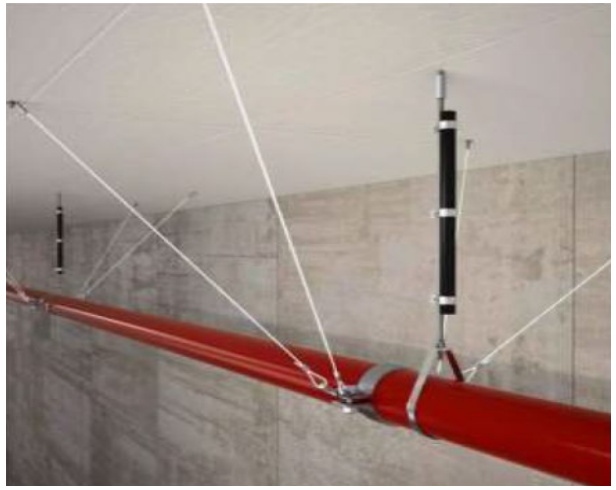
Recommended for noise and vibration isolation for mechanical equipment located near critically quiet areas when there is a possibility that the equipment to be isolated will be subjected to the external forces associated with an earthquake.

The housings are fabricated to limit vertical movement of the isolated equipment if equipment loads are reduced or if the equipment is subjected to large external forces such as high winds or seismic events.

Rubber/Neoprene Vibration Isolators

Recommended for the isolation of vibration produced by small pumps, vent sets, low pressure packaged air-handling units, and other mechanical equipment

EQUIPMENT PROTECTION



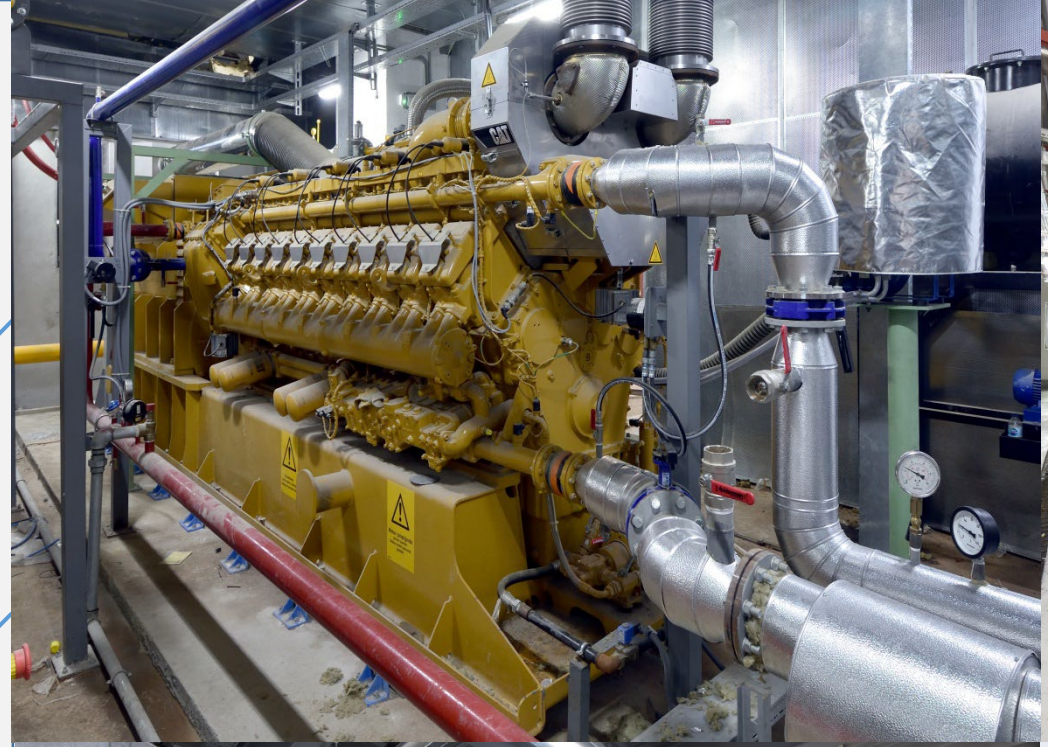
Seismic Steel Rope

For suspending equipment, pipes, channels, electrical pans, etc. they should be pre-stressed, elasticity-free, galvanized, high-resistant seismic steel ropes.

Seismic Restrictor

They are the restrictors which are connected to the building together with the equipment itself or its frame through welding or bolting.

EQUIPMENT PROTECTION



LIFELINES PROTECTION

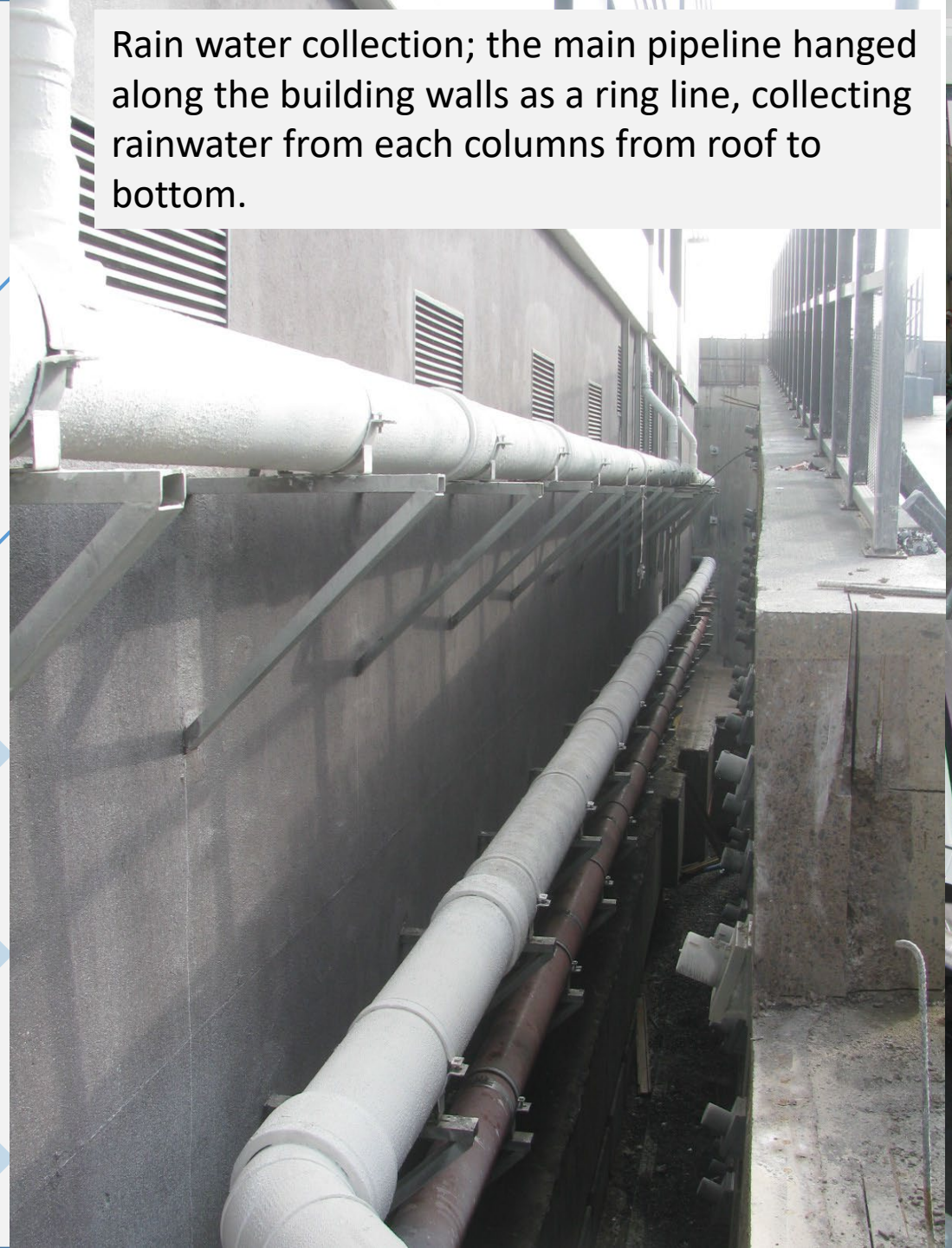
LIFELINES PROTECTION

- After securing the building structure by base isolation system, the question is “How to protect the lifelines during an earthquake?”
- As an example, Kartal City Hospital base isolation model allows the building to make 82 cm displacement at max during a severe earthquake.
- The intensity of energy discharge creates an acceleration in the beginning of displacement which exposes a pull away force on rigid connections around the building.
- Therefore those connections should be flexible and meet the movement measures.

*** Please see the video in “Displacement.rar”

LIFELINES PROTECTION

Rain water collection; the main pipeline hanged along the building walls as a ring line, collecting rainwater from each columns from roof to bottom.

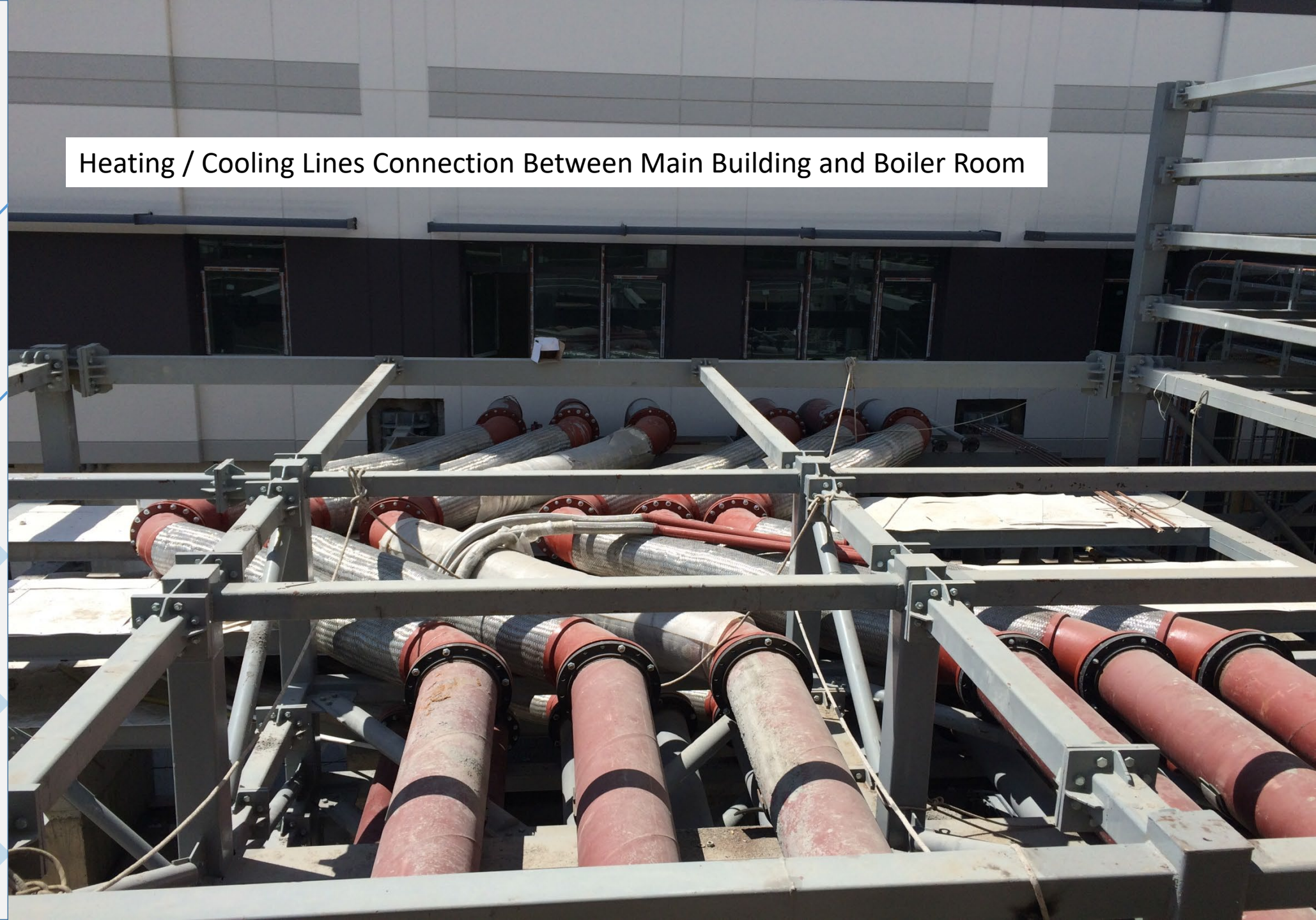


LIFELINES PROTECTION

The final connection to grid made by flexible steel hose.

LIFELINES PROTECTION

Heating / Cooling Lines Connection Between Main Building and Boiler Room



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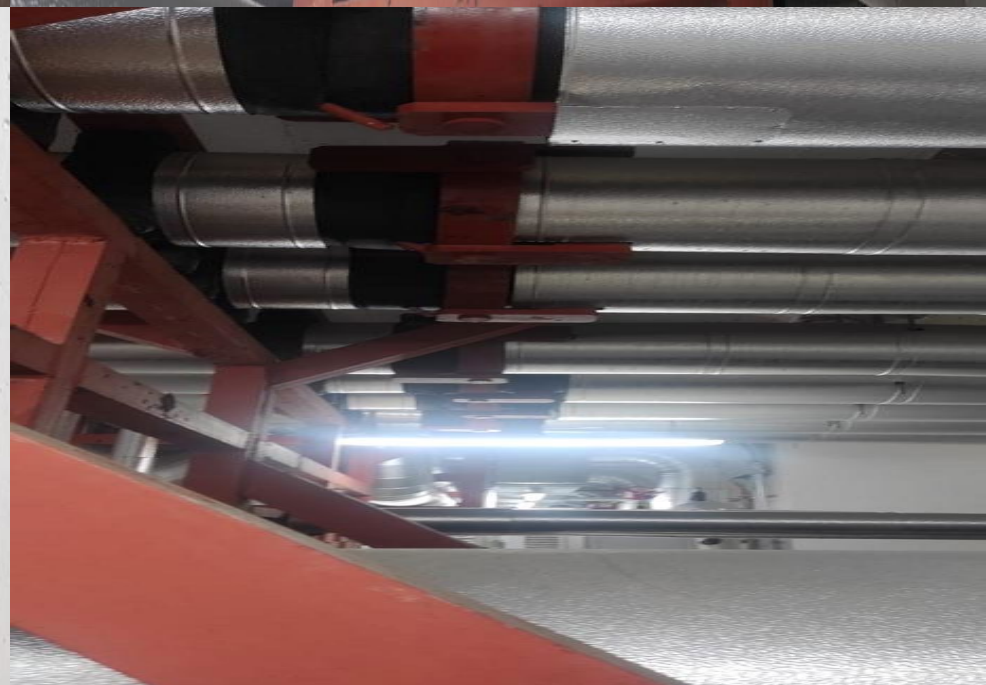

THE END

THANK YOU