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MECHANICAL TECHNICAL REPORT
NATIONAL HISTORICAL MUSEUM

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RAPORT OF THE EXISTING CONDITION FOR MECHANICAL SYSTEMS

1. FIREFIGHTING SYSTEM

The fire protection system was initially designed to be supplied with water from the city network, as it met the amount and pressure needed for this plant, but over the years there was a significant shortage of water and therefore the need arose for modifications in this plant. The modifications in this plant were made by adding a pumping station and water tank on the -1 floor of the building. But, despite the modifications that have been made, this plant is out of any kind of technical norm.

The distribution lines are empty and due to the typology of the system composition as a wet system, this plant may never have functioned and is currently completely out of order.

Hydrants of dimension DN 45, MT 30 are placed two hydrants on each floor of the museum pavilions and two hydrants in the northern part of the museum administration. This distribution of hydrants is incorrect in relation to the surfaces they cover. In addition to the number of hydrants as mentioned above, their positioning in the premises is inappropriate as some are hidden and locked in separate rooms (inability to use and access)

Conclusion

The firefighting system is completely amortised and out of the respective norms. For this reason this system will be built entirely new.

2. WATER SUPPLY SYSTEM

The water supply system was initially designed to work with supply and pressure from the city network but due to significant shortages of continuous supply from the city network this system has been modified. In the technical environment located on the underground floor of the building are placed four water tanks of 3000 Lit. each and a centrifugal pump which supplies a 5000 Lit tank located on the terrace. All the sanitary nodes of the museum are supplied from the terrace reservoir

From the technical point of view regarding the pumping station, this system is built with constructive defects. This causes the system to not function properly and has caused modifications to the distribution network. Not all toilets are in operation, this has come either due to insufficient network modified, due to defects or due to cost.

Conclusion

The water supply system is completely amortised and out of the respective norms. For this reason this system will be built entirely new.

3. WASTE WATER DISCHARGE SYSTEM

The water discharge system is functional. But this system was built with the design concepts and technology of 30 years ago, not using the balancing columns as well as the individual ventilation columns. All points of connection of the discharges, control points and ventilation hoods located on the terrace, are damaged due to unprofessional modifications or repairs that have been made in time. These are the cause of hidden leaks of moisture, etc., which damage the structure of the building.

Also the materials used for the exhaust pipes are cast iron pipes which result in an advanced consumption.

The external discharge network is functional. But this network presents significant problems related to its degradation, for example: parts of damaged sewers that leak water, damaged structurre of the manholes, filled with calcified decantations, damaged manhole covers, etc.

Conclusion

The waste water discharge system is completely amortised. For this reason this system will be built entirely new.

4. RAINWATER DISCHARGE SYSTEM

The internal network consisting of terrace drain and vertical columns results in significant functional problems. The water drains on the terrace are in large numbers compared to the intensity of the rain, but due to the non-functioning of a large number of them due to their amortisation, blockage of some columns (due to the work done on the terrace) results that the few functioning columns are insufficient to discharge the terrace waters.

The external network is functional, but this network presents significant problems related to its degradation in its entirety, for example: parts of damaged sewers, filled with decantations, damaged manholes in the structure, filled with calcified decantations, manhole covers damaged etc.

Conclusion

The rain water discharge system is completely amortised. For this reason this system will be built entirely new.

5. AIRCONDITIONING SYSTEM

This system consists of the group of Boilers, the group of Chillers and the group of AHU-s which are not in the respective premises in the basement floor of the building. All this system is built with the technology of 30 years ago and has undergone a physical amortisation due to unprofessional use and periodic maintenance and today has been completely eliminated.

Conclusion

The airconditioning system is completely amortised and out of the respective norms. For this reason this system will be built entirely new.

OPPORTUNITIES FOR INTERVENTIONS FOR RECONSTRUCTION AND CONSTRUCTION OF MECHANICAL SYSTEMS

In support of the conclusions and interventions of the reconstruction of other disciplines, interventions and reconstruction of mechanical systems, will be as follows:

1. FIRE FIGHTING SYSTEM

The fire fighting system will serve for active protection, fire extinguishing and smoke control. This system consists of two water protection plants and a gas protection plant.

1.1 FIRE FIGHTING SYSTEM WITH WATER

Fire fighting with water system is composed by:

1. The technical environment of the fire fighting system composed by:
   a. Water reserve built with R / C, which will serve to accumulate the required amount of water based on the capacity of the fire protection and sanitary plant and will be completed with all the necessary accessories for operation.
   b. The pumping station will be composed of the group of main electric, diesel pumps and the Jockey pump. This station will be built according to the relevant European norms, completed with all automatic control accessories, etc
2. The hydrant water supply network will be built on the basis of fire protection norms and consists of:

a. The network of internal hydrants which will be installed in accordance with the composition of the interior and provide a total protection of the building.
b. External hydrant network and connections to the autopump which will ensure the protection of the building from the outside

1.2 FIRE FIGHTING SYSTEM WITH GAS

The fire fighting system with gas is composed by two systems:

1. Automatic gas protection system which will be used in closed environments such as archive or fund premises, in electrical premises such as servers, etc., and will be built by:
   a. Cylinder reserevs with gas IG55 or FM 200, which will be used for the gas rire fighting according the respective capacities of the premises.
   b. Gas sprinklers distribution system

2. Manual gas protection system which will be used in open spaces such as pavilions, etc., will consist of portable manual cylinders positioned in order to protect museum objects.

a. The portable cylinders will be positioned in all the building premises and adapted with the fire category.

1.3 FIRE FIGHTING SIGNALING

The signalization will be used to indicate the passage and rescue routes, the location of the fixed and portable extinguishing devices, as well as the position of the alarm signal buttons. The signaling is completed with electrical systems for smoke or fire detection as well as control of all water and gas extinguishing systems.

2. WATER SUPPLY SYSTEM

The water supply system will serve for the water supply of the building and consists of the cold sanitary water supply system, the hot sanitary water supply system and the technical water supply system.

The sanitary water supply system is compounded by:

1. Technical area with is built by:
   a. Water reserve built with R / C, which will serve to accumulate the required amount of water based on the capacity of the fire protection and sanitary plant and will be completed with all the necessary accessories for operation.
   b. Pumping station which will be composed of a set of electric pumps connected in series. This station will be built according to the relevant European norms, complete with all automatic control accessories, etc

2. The water supply distribution network will be built in accordance with the architectural structure of the sanitary facilities of the building and will consist of:
   a. Water supply network from the pumping station to the collector and distribution in the sanitary node.
   b. Water supply network from the collector to the sanitary node to the sanitary equipment.

2.1 HOT SANITARY WATER SUPPLY SYSTEM

The hot sanitary water supply system is compounded by:

1. Sanitary hot water supply plant is the plant of production and delivery of sanitary hot water in hydro sanitary equipment and will consist of:

a. Hot water will be produced by the electric boilers
b. Distribution pipes from the boiler to the sanitary equipments.

2.2 TECHNICAL WATER SUPPLY SYSTEM

The technical water system is the water production plant with specific parameters based on the technical requirements and its delivery to the mechanical equipment and is made by:

a. Filter group
b. Water softener

The distribution network of the technological water will be built based on the network configuration and the mechanical system positions.

3. WATER DISCHARGE SYSTEM

The water discharge system will serve to collect water from the building. This system consists of a waste water discharge system and a rainwater discharge system. Both of these systems will be built on the basis of water discharge norms and in accordance with new architectural structures and constructions.

3.1 WASTE WATER DISCHARGE SYSTEM

The waste water discharge system will be composed by:

1. Insternal waste water discharge system consist of:

a. Sanitary nod discharge
b. Vertical discharge and balance columns
c. Horizontal discharge pipe passage

2. External waste water discharge system consist of:
   a. Discharge manhole which will be constructed in such a way as to collect all the discharge columns coming from the sanitary nods of the building.
   b. Discharge manhole which will connect the external network of the building with that of the urban discharge network.

3.2 RAIN WATER DISCHARGE SYSTEM

The rain water discharge system will be composed by:

1. Internal rain water discharge system consist of:
   a. Terrace drain
   b. Vertical and horizontal pipe from the building to the building external discharge network
2. External rain water discharge system consist of:
   a. Discharge manholes that collect the waters that come from the terrace drains of the building .

4. AIRCONDITIONING SYSTEM

The air conditioning system will serve to create microclimates in the interior of the building, making temperature control, humidity control and air flow control, etc., according to the specific conditions of each environment. This plant will consist of air / air system, air / water system and air / gas system (VRF).

4.1 AIR/AIR SYSTEM

The air / air system consists of a system with 100% fresh air, which means that it will be calculated to meet the demand of thermal loads, the demand for fresh air and the removal of polluted air from the environment. Air / air system will be used in those rooms that have a high demand for air purity as well as rooms that require high air humidity controls. This system will consist of:

1. Air handling unit that will serve for the processing of fresh air and its behavior in the required parameters by regulating the temperature and humidity.

2. Chiller, which will serve for the production of thermal energy both in the winter season and in the summer season.
3. Air ducts and shutters, which will serve to send air from the treatment equipment to the indoor premises, as well as the removal of polluted air from these premises.

4.2 AIR/WATER SYSTEM

The air / water system consists of two systems, the air system and the water system. The air system serves to supply the interior with fresh air and to remove polluted air from these premises. The water system will serve to meet the demand of thermal loads through internal machines. The air / water system will be used in those environments where the air humidity requirement is not very high. This system will consist of:

1. Air treatment unit or Recuperator Units, which will serve for air processing and its behavior in the required parameters.
2. Chiller, which will serve for the production of thermal energy both in the winter season and in the summer season
3. Air ducts and diffusers, which will serve to send air from the treatment equipment to the indoor premises, as well as the removal of polluted air from these premises.
4. Fan Coil units, which will serve to meet the demand of thermal loads.
5. Hydronic network, which will serve for the supply of hot / cold water to the fans and be built with the delivery line, return line and reverse line

4.3 DIRECT EXPANSION SYSTEM

The typology of the air conditioning system that will be used for the air conditioning of the administration/ server room etc... premises is the direct expansion system

The gas system serves to supply the internal terminals which withstand the thermal loads of losses in the environment. These devices are of wall type, floor, channel, etc. and is supplied with fluid (in the gaseous / liquid state) by the compressor system of the outdoor unit. Refrigerant gas R410A, is ecological gas not harmful to the environment, supplied by compressors through indoor units in the right amount in relation to demand. So as long as there is a demand from the customer for heating or cooling, as much gas will be sent for thermal exchange, to reach the desired comfort and temperature levels