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MANSILLAS THERMOPLASTIC SYSTEM (*MTS*). INTRODUCTION

The company has developed a model of manufacturing through technology and innovation, sustainable with the environment consisting of the manufacture of plastic in situ called **Mansillas Thermoplastic system (*MTS*)**, Which allows to rebuild structures that, due to their use, have defects with leakage results, such as pipes, tanks, reservoirs, containers, ponds, swimming pools, In order not to have to modify them or to resort to a purchase investment which would cause disturbances related to assembly and dismantling. Also this manufacturing model is developed for the manufacture of new parts everywhere and for all climatological conditions.



The plastic molecular characteristics of the ***MTS*** contribute to high resistance to environmental degradation and biodegradation, its own degradation is very slow on the order of several decades for a total degradation, the ***MTS*** is reliable for the protection of any structure of different types of substrates.

Its elasticity and flexibility properties make it suitable for different forms and applications.

The ***MTS*** is designed to meet the demands of a wide variety of industrial and civil uses, thanks to the decisive role played by plastic in the development, improvement of living conditions and the accelerated growth of science and technology. Some advantages of the different types of ***MTS*** are:

- The economic investment in recovering or rehabilitating the defective structure is less than if the same piece of metal, concrete or any substrate is re-purchased, the economy is between 50% and 60%.
- After the finalization of manufacturing, it is instantly operational.
- Once the ***MTS*** implemented the cost of maintenance of the facilities is reduced by 90%, facilities increase the production time to less unplanned maintenance shutdowns.
- Complies with the strictest international microbiological standards in terms of water and food quality.
- Resistance to high temperatures 250C°.

- Resistance to high concentrations of different acids.
- Resistant to petroleum products and solvents in function of primary containment.
- Increase the life longevity of the protected structure, in comparison with a new structure of concrete or stainless steel, making it very profitable investment.

COMPETITIVENESS

This developed and patented manufacturing model has become the best ally to reduce downtime and unnecessary costs at the customer's premises and thus preserves the usual functionalities, improving the longevity of the structure for the benefit of the final consumers.

All this development of manufacturing model is protected through patents in different countries.

Versatile and reliable technology for manufacturing of new structures or protection and repair existing surfaces: getting a new body on the original surface, with the maximum adaptability to the irregularities of this, this will act as a waterproof coating, highly resistant to degradation impacts, corrosion or abrasion among others.

Technology that manufactures In situ a new structure according to the different uses and requirements from polyethylene plastic, PVC derivatives and other ceramic fillers. Intended for the continuous production and recovery of parts and structures of different surfaces of all types of substrate, using as molds any type of structures defective by use or time such as tanks, Wells, inner-outer pipes, manholes, covers.... In order to eliminate leaks, infiltrations and ruptures of such installations, turning the total structure into plastic. Designed to be in contact with drinking water and food products, with good resistance to high temperatures and acidic media (* caused by fermentations of products), also with high abrasion resistance and degradation.

The most important advantage is that the creation of new parts or the recovery of defective structures is carried out in the customer's plant without the need to disassemble parts or to stop the operation of the installation.



Fast implementation, the system is made on site with our mobile autonomous factory; it is operational between 6 and 20 seconds after application, so that the commissioning of the facility carries a maximum of 24 hours

The **Mansillas Thermoplastic System (MTS)** is a perfect solution by any surface that plasticized in situ a continuous sheet (without joints or unions) for the repair and protection of concrete structures and facilities, metal, asphalt, wood, fiberglass or any other building material.

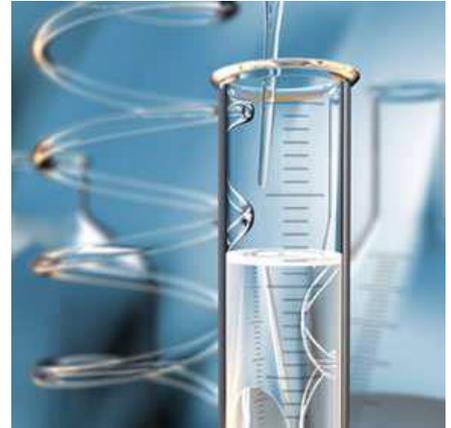
Protection against environmental degradation is achieved, including natural hazards such as earthquakes, chemical and physical degradation.

It can be used for the same uses as any traditional coating, providing high resistance and longevity to structures.

PROPERTIES

The physical and chemical properties under study to assess and compare the effectiveness of any system of protection of structures are elongation, compression, resistance to high temperatures and fire, hardness, permeability, elasticity, adhesion...

The physical qualities of the **Mansillas Thermoplastics System** ensure maximizing useful life of the infrastructure on which the system is implemented. That is, when a system with good chemical resistance, no permeability and abrasion resistant is selected and properly installed and inspected, longevity and maximum useful life of assets is guaranteed.



I. HARDNESS AND ABRASION.



Instead of just interpreting the hardness value, the value should be studied together with the abrasion resistance of the **MTS**. A value of less abrasion loss is most relevant to the protection systems that hardness. A larger value of hardness values decreased abrasion. It should balance when choosing the suitable thermoplastic system based on the premise that it is more desirable to have a better resistance to abrasion than a higher hardness. To adopt appropriate criteria ASTM D4060 and ASTM D2240 will be considered.

The **MTS** has a high hardness (Shore D 45-50) and abrasion resistance (<15mg loss), which highlights its use in wastewater treatment: these installations have plenty of abrasives in the current due to suspended particles that carry, **Mansillas Thermoplastic System** is the optimal tool for avoid this wear.

II. TEAR RESISTANCE.

The tear strength of the **MTS** is 75 to 80 KN /m, making it a performance attribute with high value therefore it is ensured the integrity of the laminated structure.

III. ELONGATION AND TENSILE STRENGTH.

In the application case for waterproofing surfaces, high elongation (both final: how can stretch the implemented system before failure occurs, such as elastic: how much can be stretched back to its original length after the stress stop) is required to provide an optimal solution



The more elastic **MTS**, that can stretch with much less force and the strong resistance of these systems to punctures and tears (as mentioned above), are attributes that make **MTS** ideal for any application where there are changes on the substrate. The tunnels and tanks with concrete, for example, move and settle with the movement of the ground.

The **Mansillas Thermoplastic Systems** with excellent elongation and tensile strength can cover successfully the cracks and voids in the substrate

IV. RESISTANCE TO CHEMICAL DEGRADATION



Mansillas Thermoplastic Systems are resistant to chemicals such as petroleum products: gasoline, diesel, motor oil; and other chemicals such as sulfuric acid, hydrochloric acid, acetic acid, hydrogen sulfide, sodium hydroxide, ammonium hydroxide, ... according to ASTM D 3912, which protect and extend the useful life of structures and facilities

The importance of the chemical resistance of **Mansillas Thermoplastic Systems** is highly valued by many sectors. Take for example the introduction of **MTS** wastewater facilities. Although the major component of wastewater is water, a multitude of chemicals such as alkalis, acids, solvents are found in small amounts, but significant enough to be corrosive. Bacteria are the primary cause of corrosion attack in sewage systems; these bacteria produce hydrogen sulfide that create the sulfuric acid which attacks the concrete structure. The thermoplastic system has been designed and tested with a multitude of chemicals including sulfuric acid 98%, sodium hydroxide, chlorine, acetic acid, acetone, just to name a few.

V. PERMEATION.

The lowest permeation is the most desired property for a system to protect submerged structures, along with its ability to withstand the environment in which it is immersed. The **MTS** is able to resist or offer the maximum resistance to molecules transmission.

ENVIROMENT PROTECTION

The management of municipal or industrial waste is becoming more important. The waste containment systems must provide a high security guarantees, due to that spills or leaks from these wastes can cause environmental disasters involving high costs of recovery or the irretrievable loss of habitat.



The above advantages make the use of the **Mansillas Thermoplastic System** in an added value for rehabilitation and maintenance projects; being the most profitable, reliable and fastest option

The **MTS** provides a strong barrier to spills, preventing them from reaching the environment. In this type of application, the **Mansillas Thermoplastic System** fits perfectly with the shoes, pipes and protrusions to form a complete sea

Mansillas is extremely concerned about the welfare and the environment in all countries where it operates.

The storage, handling and application of the system is very safe and does not threaten the environment or humans. **Mansillas Thermoplastic System** does not produce migration so it is recommended for use in contact with drinking water, food and medical facilities system.

*** NO VOLATILE CONTENT.**

The **Mansillas Thermoplastic System** is free Volatile Organic Compounds (VOCs), making the system a secure solution for both people and the environment; as many VOCs are causing problems such as photochemical smog or instances of toxicity and allergies in living things

PERFORMANCE: TECHNICAL DATA

DATOS TÉCNICOS (Todos los valores @25°C)	
Volumen de sólidos	100%
Compuestos orgánicos volátiles	0 gm/ lit
Cobertura teórica @ 1mm	1m ² / lit
Peso específico (kg/ litro)	A-1.056, B-1.052
Viscosidad a 25 °C en cps (ASTM D 412)	A-260, B-380
Vida útil de almacenamiento a 25 °C	12 a 18 meses
Resistencia a la tracción (ASTM D 412 C)	18 a 23 MPa
Elongación (ASTM D 412)	350-450 %
Dureza ASTM D 2240	45 a 55 Shore D
Flexibilidad (2mm mandrel ASTM 1737)	Supera
Permeabilidad al vapor de agua ASTM E 96	0.00036 perm-in
Absorción de agua -24 horas (ASTM D 471)	< 0.5%
Puenteo de fisuras @-25_C (ASTM C 836) , 25 ciclos	Supera
Resistencia al desgarró (Die C ASTM 624) (KN/m)	75 a 80
Resistencia al impacto	> 20 J
Inflamabilidad, propagación de llama -ASTM E 108	Class 2, Clase A
Punto de inflamación Pensky Martin	>93 °C
Temperatura de servicio (en seco)	-30 °C a 120 °C
Resistencia a la abrasión (ASTM D 4060)	<15mg perdida Taber CS 17 wheel 1Kg/1000 rev

CONCRETE PROTECTION

Concrete is the most used construction material, so it is very important its protection. Corrosion degrades unprotected concrete, causing serious structural damage. Therefore, it requires a protective coating to remove these processes of degradation and maintain the longevity of structures.



The properties of **Mansillas Thermoplastic System** become in an effective system for the protection of concrete exposed to aggressive environments: protects concrete structures against causes that deteriorate, among which are the degradative effects of seawater, bacterial corrosion, physical damage and chemical damage (from carbonation, chlorides, sulfates ...).

This would be the case of concrete in contact with sewage. If it is not properly protected, can degrade quickly when sulfide generation unchecked. Hydrogen sulfide (H₂S) is a gas known for its toxicity and its ability to corrode a wide variety of materials used in the construction of sewers and treatment plants, including concrete.

** Concrete corrosion is caused by aerobic microbial oxidation of hydrogen sulfide to sulfuric acid and the subsequent chemical reaction of the acid with the cement binder in concrete.*

The implementation of the **MTS**, previous study of the surfaces to determine the severity of the impairment, able to restrain and protect structures due to its high resistance to toxic chemicals and other degradative agents.

ADVANTAGES

The main advantages of the **Mansillas Thermoplastic System** are the following:

-  Advanced technology for the creation of a new body on the existing support, which provides a perfect barrier or protection against external attacks.
-  Possibility to manufacture new parts.
-  Adaptation and specific system design for each project .
-  Complete technical Mobility: System implemented in the place required by the customer, by autonomous-mobile factory.
-  Faster execution of projects: Fast Uptime 6 to 20 seconds.
-  Indifferent system to moisture and temperature. It is not sensitive to high humidity and can be applied to virtually any temperature without complication.
-  Classification of low permeability and water vapor transmission.
-  Excellent physical properties: abrasion resistance, tensile, impact, tear, fire, chemicals...
-  Excellent adhesion.
-  Continuous system, no joints or cracks: removing access to fluids, bacteria and other contaminants entering the bracket and degrade it.
-  Long-term stable system, maintaining original physical properties even in long-term aging and obtaining the maximum durability of the structures.

- 📌 Environmentally friendly.
- 📌 Effective and economical option. Highly profitable system after cost-benefit analyzing:
 - › Increase the value of projects and equipment: reduced downtime and increased useful life.
 - › Substantial cost savings with the implementation of the system, the replacement of plant, transfer and / or transport of parts not needed.

VERSATILE SYSTEM

There are several applications for which the **MTS** is the ideal solution, regardless of the industry or sector: most have the need to protect their roofs, floors, workshops, warehouses, facilities ... Many of these industries have equipment and installations where reinforcement as a protective **Mansillas Thermoplastic System** doubles its life, which is a great advantage for these industries

Potable water systems, pipelines, processing plants, waste tanks, also benefit from this advantage; like roads and other infrastructure related applications. **Mansillas Thermoplastic System** implement and adapts the system to the specific needs of each client.

THERMOPLASTIC SYSTEM (**MTS**): PETROCHEMICAL INDUSTRY



Given the important value of this industry as first link in supply chains is essential to protect their facilities to reduce production costs, have more efficient processes and better care of the environment. The petrochemical industry requires significant security measures to prevent environmental damage and its processes are potentially polluting, high environmental impact.

The **Mansillas Thermoplastic System**, thanks to its properties, is present in different areas of the petrochemical industry: construction of pipelines; infrastructure in refineries and in vehicles or containers for distribution of different end products

The **MTS** is a highly effective tool for the process of maintenance of equipment and facilities, avoiding the high costs in production involving breakdowns, downtimes, replacement of parts... of equipment or installations subject to heavy wear. Some examples are: turbines, furnaces, storage tanks of chemicals, etc.



THERMOPLASTIC SYSTEM (*MTS*) : PIPES

Pipelines are a major means of transport of fluids. It must be protected against corrosion, temperature, pressure... to prevent production losses, leakage and emission of pollutants.

Unprotected pipes (buried underground, exposed to the atmosphere, in aggressive environments or immersed in water ...), are susceptible to degradation. Corrosion is one of the main causes of deterioration, weakening the structural integrity of the pipes and making them unsafe vehicle for fluids transport. The cost of an unexpected shutdown by a leak is higher in magnitude than the costs of setting up an advanced corrosion protection system as **Mansillas Thermoplastic System**.

Control the deterioration of corrosion pipes saves money, preserves the environment and protects the integrity of facilities increasing its durability.

With **MTS** the pipes are thermally insulated and also the supports are protected, whether of steel or concrete



**Deteriorated industrial facility
Severe corrosion problems and active fluid leaks.**

The pipelines, aqueducts and pipes used in various industries, such as food, are treated with specific thermoplastic systems to required needs: physical, mechanical and chemical resistance, among other factors; both the inside and the outside.

OUTER PIPE PROTECTION

The **exposed pipes outside** to atmospheric conditions tend to accumulate water, dust, rust ... these substances corrode the metal surface. So it is essential the application of a **protective-armor insulation** as **Mansillas Thermoplastic System**. This system is characterized by being continuous, leaving no unprotected weaknesses such as welds, angles, edges and corners, which extends the useful life of the pipes.



The **MTS** avoids the effects of electric fields of direct and alternate current that form around underground pipes and prevents corrosion that threatens the integrity of these structures. The protection with **Mansillas Thermoplastic System** in the **buried pipe** need not be accompanied by a cathodic protection system to ensure an extended service life. Being both compatible systems



With traditional products such as paints or coatings cannot achieve optimal protection levels. It is almost essential cathodic protection, not about continuous systems, bringing in the application process itself or during transport or in installation can generate impurities, bumps, scratches...

Buried pipes protected with **Mansillas Thermoplastic System** are electrically isolated from the surrounding terrain; resisting factors, such as proximity to water bodies, buried facilities, foundations of buildings, pylons or other pipes.

INNER PIPE PROTECTION

The **MTS** is implemented both rehabilitation and prevention of pipes; providing a seamless barrier, that permanently prevents the generation of corrosion and chemical resistant, water, extreme temperatures and high pressures.



By robotic applications, the **MTS** can be implemented without external works and hard to reach areas.

The **Mansillas Thermoplastic System** is used for interior restoration of old or damaged pipes, locating anomalies and damaged parts of the network and creating a plastic barrier.

The use of robotic systems ensures the quality and safety of interventions, making a seamless protective that provides a confinement barrier, elastic and resistant to corrosion and abrasion, manufacture of a new plastic pipe for inner.

THERMOPLASTIC SYSTEM (MTS) : PRIMARY AND SECONDARY CONTAINMENT

I. PRIMARY CONTAINMENT



The primary containment barriers such as tanks or storage depots, existing in industrial facilities must be in perfect condition and **Mansillas Thermoplastic System** is an effective tool for achieving this. The facilities are protected externally (avoiding infiltration and aggressive agents) and internally (protecting against own substances contained and **even thermally**).

The considerable savings achieved when the owner decides to rehabilitate a facility instead of replacing, it is an important factor to consider in choosing the **STM**.

Installations with its structural integrity intact can also be protected with the **Mansillas Thermoplastic System** to increase its useful life at their full potential.

II. SECONDARY CONTAINMENT

The industrial facilities, that have tanks for storage of products, require maintain a secondary containment system to protect the environment against possible leakage of the primary containment.



The **MTS** is an ideal solution for the protection of such structures for their high resistance to contact with various products and their ability as corrosion barrier.

Secondary containment facilities treated with thermoplastic system:

- Perimeter containment walls and trays.
- Manholes.
- Bunded Tanks.
- Complementary accessories: gutters, pipes, slopes that limit the scope of the spill, etc.

THERMOPLASTIC SYSTEM (MTS) : FOOD, HEALTH AND PHARMACEUTICAL INDUSTRY



It is ideal for the protection of walls, floors and ceilings of chambers (storage, refrigeration ...), food processing plants, slaughterhouses, silos, warehouses, and almost any structure exposed to degradation.

Mansillas Thermoplastic System poses no nutrient substrate for microorganisms. It is rot-proof, no mildew and decay. Nor it is attacked by soil bacteria.

The advantages to stand out of the STM for these sectors are:

- Durable. Increases the life of the facility.
- Hygienic, facilitates the process of cleaning and maintenance, preventing the growth of microorganisms and it is generating a more sterile environment.
- Antislip.
- Very strong at low and at high temperatures.
- No migration of chemicals: can be used in contact with food, potable water.
- Resistant to highly acidic or basic pH.

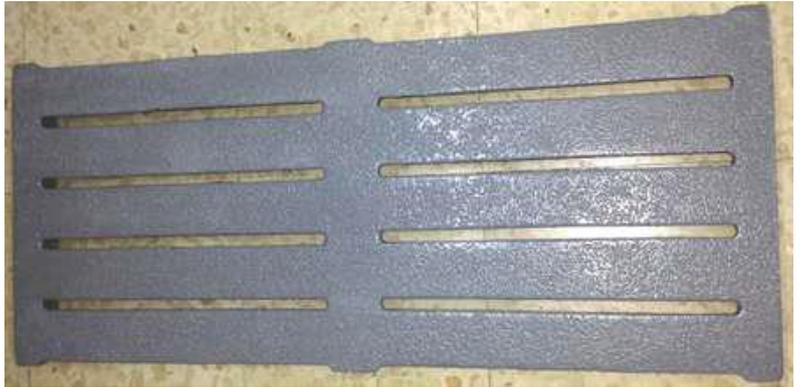
FOOD INDUSTRY AND AGRICULTURAL INDUSTRY

The **Mansillas Thermoplastic System** is usually employed as:

- ▣ Protection of interior and exterior storage tanks or silos; inner, to improve storage of products and outer, to protect from external attacks.



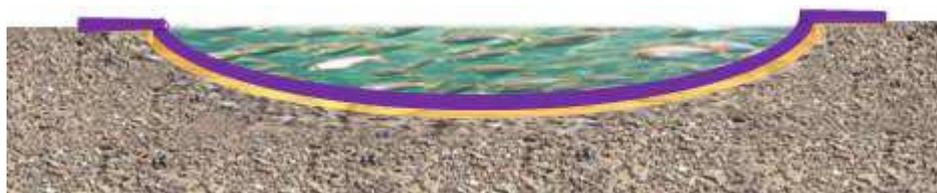
- Used as insulation to help in the maintaining of constant required environmental conditions.
- Conditioning soil and cabins for intensive production. Livestock and aquaculture: degradation prefabricated concrete by slurry and animal waste or by water laden with chemicals degrading.



- Protection to covers and roofs of agricultural installations: waterproof and insulate from the exterior and protect against degradation caused by inner aggressive environmental conditions.
- Protection system from leaks and spills of various wastes such as manure, potentially polluting the environment.



- Rehabilitation of old structures.



HOSPITAL AND PHARMACEUTICAL FACILITIES

Hospital and pharmaceutical facilities require stringent conditions according to current sanitary regulations. The results obtained in laboratories depend on that environmental conditions are controlled and standardized. A proper control of these conditions is important for the welfare of the staff, the operation of instruments and safety at work.



Mansillas Thermoplastic System manufactures smooth, non-slip, hygienic surfaces and resistant to corrosion and heat. This facilitates to get the conditions necessary for a proper working environment.

The implementation of **MTS** as a protective and insulating vehicle provides: more secure facilities, long-term savings thanks to ease of maintenance and cleaning, avoiding costly shutdowns for repairs or inspections

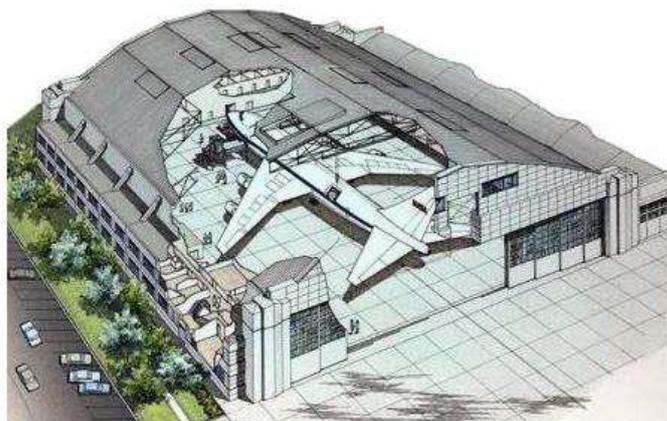
MANSILLAS recommends the implementation of Thermoplastic System in hospital and pharmaceutical areas as it is not susceptible to bacterial proliferation and resists without alterations the steam cleaning, chemical cleaning or disinfecting

THERMOPLASTIC SYSTEM (MTS): MEANS OF TRANSPORT



We offer protection and maintenance solutions for all modes and means of transport, including infrastructure, keeping in each performance the utmost attention to respect for the environment, technical quality, optimizing the duration of the work and the safety in the implementation of **MTS**.

- **AVIATION SECTOR:** Protection of the various facilities of aerodromes and heliports, including hangars, fuel storage tanks or water.



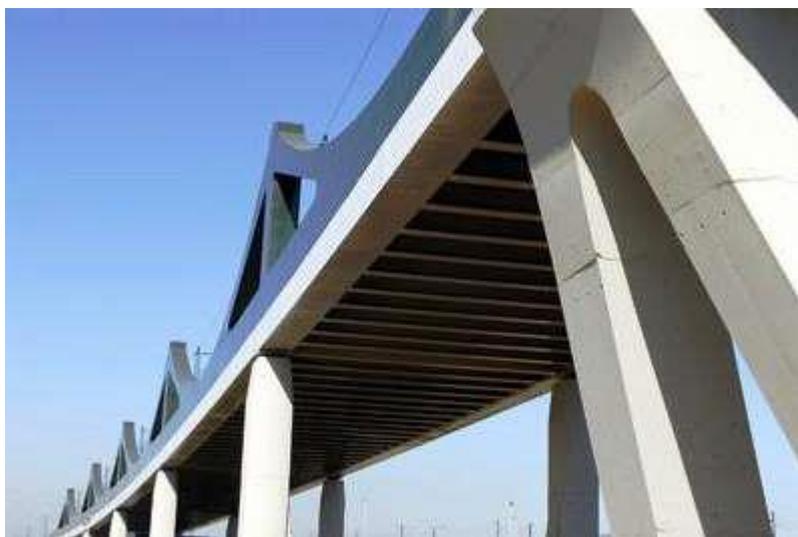
- **NAVAL:** The **MTS** is present in new construction as well as repairs and improvements to port facilities and vehicles for maritime and inland waterway transport; such as cargo ships, fishing vessels and its seawater refrigerated tanks, container ships, tankers...



Special mention deserve the actions taken to protect the structures of tankers or tank to which, in addition to the general requirements of resistance required by other maritime vehicles, they have specific needs systems for contact with solid loads, liquid or gaseous transported, for example oil, liquefied natural gas, liquid chemicals, food products, dry bulk cargo or refrigerated products.

** The sea water is highly corrosive and the surfaces, into direct contact with water, need a durable coating. The hull, decks and all areas experiencing prolonged exposure of sea water need waterproofing and protection for corrosion.*

- **GROUND TRANSPORT:** Highly effective as a waterproofing system for roads, railway viaducts and bridges incorporating **MTS** between the concrete deck and layer/s of the asphalt pavement. The **Mansillas Thermoplastic System** manufactured and incorporated before applying new asphalt helps extend the life of these. * For more information, please visit the Civil Engineering paragraph.



Among the solutions provided by the **MTS** for the automotive sector, we highlight mainly the inner and outer protection for vehicles and the bodywork.



It also provides an aseptic and hygienic environment to vehicles prepared as medical units, providing surfaces: non-slip, smooth, waterproof, washable and resistant to disinfection; or vehicles for the transport of food according to the international agreement ATP-1970.

The implementation of **MTS** in transport of dangerous goods provides more security given the characteristics of sealing that provides: Withstands pressures and expansions that, due to transportation may occur; no act as a catalyst for reactions and neither react with them.



THERMOPLASTIC SYSTEM (**MTS**): POWER GENERATION



The power generation industry seeks greater plant efficiency and minimizes emissions of pollutants in compliance with international environmental regulations. To achieve its objectives, require the use of technologically improved materials that are more prepared to be exposed to the high operational demands.

With the use of **Mansillas Thermoplastic System** is achieved ensure the integrity of the facility, prevent leaks and withstand without cracking the extreme temperature changes that often affect materials.

The unique physical characteristics of strength and adhesion of the thermoplastic system make it suitable for use as envelope of the following services and parts:

- Cooling systems: include tanks, swimming pools, towers, piping ... should be covered and protected.
- Conveyor belts of raw materials to reduce abrasive wear.
- Protection of deposits.
- In leaks containment systems from rainwater.
- Storage of waste, including radioactive.

- Water supply system, in other words, the set of infrastructures and equipment destined for water supply.
- Hydropower infrastructure: dams, weirs...
- The laminated inside the cars, containers and trucks reduces adhesion of raw materials.
- The **MTS** is useful for plasticizing wind turbines and getting harder and more durable surfaces with lower maintenance costs. It avoids static electricity that occurs in this type of facility

With the lamination of the inner face of the diversion dams, obtained with the MTS, the leaks are avoided that generate galleries by the inner and degrade the structure, reducing its capacity against pressure and safety factor.

THERMOPLASTIC SYSTEM (MTS): MILITARY



The **Mansillas Thermoplastic System** is used by the armed forces around the world. Besides standard applications are no specific military applications:

- Preventing the destructive effects caused by shrapnel. The **MTS** has a high energy absorption capacity and resistance to impact of fragments from explosions.

The **MTS** cannot stop the destruction of the surfaces of building elements, but mitigates the impact of the shock wave of an explosion and damage or fragmentation, which is the main cause of death when buildings are bombarded.



The speed of implementation of **MTS** points make it ideal for mobile operation: you can quickly build a bunker with bricks or concrete blocks, if subsequently is protected and camouflaged with the **Mansillas Thermoplastic System**.

- **Heliports.**
- **Protecting decks boats and submarines.**
- **Shielding military vehicles.** It is used to mitigate explosions significantly reducing hazardous fragments, protecting the undercarriage of vehicles going by hostile roads and dramatically reduces the weight of the chassis compared to other traditional shields.



The level of resilience **MTS** (ability of a system to withstand and recover from disasters and disruptions) becomes in a magnificent energy absorption system, behavior being also outstanding against temperature, since due to its elastic behavior can deform it without break their bonds or modify its structure.

THERMOPLASTIC SYSTEM (**MTS**): MINING AND QUARRYING.



The **Mansillas Thermoplastic System** is used in mining and quarrying by the greater need for:

 **Avoiding the abrasion and corrosion.** It is used as protection for conveyors, crushers and dump trucks, minimizing downtime or losses for replacement of equipment, increasing its useful life and being easy to repair the system if required.

 **Non-stick characteristic.** The amount of mineral that stays in the car or truck after dump is considerably minimized: using **MTS** reduces losses.

 **Binder.** Surface instabilities, such as falling blocks or breaks stratification in highly weathered areas should be treated to increase the safety and productivity of the mine, whether it is open pit (stabilizing the slope) and underground mines (surface stabilization of tunnels and galleries).

 **Protection and safety.** The use of electrical equipment in a potentially explosive atmosphere for possible leaks of methane carries the risk of an explosion or deflagration. To avoid this, the equipment used must be protected. The **MTS** can be used to prevent an explosion from spreading, encapsulating the electrical machinery to be able to withstand an internal explosion without propagating.



Environmental protection. The tailings storage ponds can cause major disasters if suffering breaks to both environmental and human levels. Using the **MTS** as reinforcement in containing these residues we prevent material degradation, increasing its life and acting as reinforcement to avoid the break; avoid the dispersion of this pollutant ensure the welfare of the environment, by the leaks that are generated over the years of use of these rafts, avoiding pedological damage and loss of aquifers.

The Mansillas Thermoplastic System provides safer facilities and increased team productivity.

THERMOPLASTIC SYSTEM (MTS): CIVIL ENGINEERING



The aim of **Mansillas Thermoplastic System** is maintain the structural integrity of the building materials used for engineering.

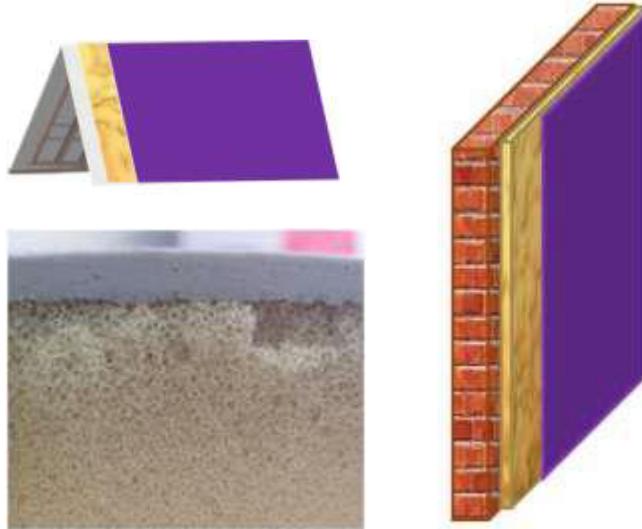
The mechanical forces acting on the structure or pressures, heat transfer or thermal cycles that will support the structures, expansion, moisture, sunlight, temperature ... All of these variables alone, or together with other factors may trigger an impairment that threatens the integrity of the infrastructure, which can be solved with the use of a specific **MTS**.

Building and Infrastructures

The **MTS** is used as protection, waterproofing and / or isolation of all types of infrastructure or facilities.

Its high elongation resists breakage by expansion or movements in the substrate that it is plasticized and works with mechanical parts, keeping the movement

MTS is effective against very serious problems for the integrity of the construction as carbonation, disintegration, decalcification, sulphation, development of vegetation ... that occur in the concrete; or corrosion problems and breakage of armor plates used in various structures such as bridges of metal.



The **MTS** is an ideal system for the protection to be compatible with other materials used in construction and to meet the requirements of adhesion, resistance to the dynamic action of vehicle, cracks caused for movements and the spreading and compaction of road surface.

The **MTS** used in bridges and tunnels minimizes the deterioration of the structures due to these causes:

FACTORS	→ THERMOPASTIC SYSTEM SOLUTION (MTS)
Inadequately compacted areas, creating cracks and driveways to external agents	→ Provides resistance to cracking.
Rainfall charged with mineral salts	→ Confers resistance against these degrading agents.
The lack of a waterproofing system or an inefficient use of system	→ Making full laminated surface: fast, strong and durable.
The use of concrete with different resistances at critical points generate an overall construction with weaknesses	→ Elimination of critical points for being a continuous system



MTS is effective for the protection of ports and docks, as it supports the thermal and hygrometric characteristics of coastal conditions. Its resistance to long-term exposure to salt water and abrasion makes it an ideal protection system for installations with daily activities entail abrasion (use of mooring chains, ships, etc).

We avoid premature deterioration of the steel surface. The salts,

trapped under a traditional coating, cause bubbles, corrosion, lack of adherence ... leading to losses and rusted out profile. The **MTS** eliminates all consequences and alterations by the presence of chloride contamination.



Geotechnical and Earthquake Engineering

Given its ductility and elongation, structures or elements subjected to loads like earthquakes, wind, snow, etc., that have been protected with **Mansillas Thermoplastic System** against such adverse situations increased their strength and are helped to maintain their structural integrity. Despite damage, is an effective aid so they do not collapse because **it is a safety barrier and protection.**



Large-scale Hydraulic Works



At present we demand more responsibility to the great works as the structures are made increasingly secure and long-lived.

The **MTS** protects armors, concrete, metal and other construction elements against degradative factors. Chasing get the criteria in the regulations and demands today's society.

Water distribution

The **Mansillas Thermoplastic System** is used for get facilities:

- › Resistant: chemical corrosion, biological degradation, stress caused by ground movements, overpressure by sudden changes in the velocity of the fluid as water hammer, Zhukowski pulses...
- › Long useful life.
- › Hermetics: leak or leaks are prevented. Avoiding and altering water quality and its properties.
- › Without loss of friction: The **MTS** is applied with a suitable



thickness and a smooth finish, increasing the flow.

The **MTS** can be applied to any structure catchment, containment or distribution of water, both channeling water consumption and wastewater. Note that the implementation of the **MTS** in pipes where access is difficult it is performed robotized manner.

The progress achieved by the use of **Mansillas Thermoplastic System** for the rehabilitation of water distribution networks is the result of research and the continuing need for more efficient, cost effective solutions and less harmful.



Wastewater treatment and sanitary engineering

The wastewater treatment is a great need. However, much of the treated water through the facilities is clean groundwater that infiltrated the system through pipes or manholes.

Industry experts believe that up to 30% of the volume of treated water is clean water filtered from pipes and manifolds.

Consequently, the rehabilitation of manholes is now recognized as essential to the restoration of the overall integrity of the collection system. In addition, repairs are relatively easy and quick, and will have a substantial impact on the treatment system. And, unlike the repair of the main line of the system can be repaired without affecting the continued use of the system.



In a Wastewater Treatment Plant (WWTP) **Mansillas Thermoplastic System** can be used both in the line of water treatment, as in line sludge: incineration systems, settling tanks, digesters, sieves, clean water pipes...

Waste containment

The **MTS** has some qualities that are ideal for protecting any structure dedicated to the containment of waste:

- ✓ As a waterproof coating on Solid Waste Landfills and to protect its network of drainage.
- ✓ In the leachate drains network and deposits.
- ✓ In mining tailings.
- ✓ To enhance the protection of facilities for nuclear waste disposal.
- ✓ To create or repair slurry wells.
- ✓ For protecting vegetable water rafts.



We can summarize that the **MTS** is an excellent material to prevent leakage of any substance that may affect the environment or public health and provides greater safety in the event of natural features to avoid highly disruptive discharge of substances from the environment.