



FRISOLI S.R.L.



PROJECT AND CONSTRUCTION OF REMEDIATION AND ENVIRONMENTAL
PROTECTION WORKS AND PLANTS



AENOR

GESTIONE
AMBIENTALE

ISO 14001

AENOR

GESTIONE
DELLA QUALITÀ

ISO 9001



GA 2016/0198

ER 0516/2024

COMPANY KIT



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ASSOCIAZIONE NAZIONALE
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PREMISE

"**FRISOLI s.r.l.**" was founded in the 80s as **Geom. Ciro Frisoli & C. s.a.s.**" A company operating in the construction sector, specialized in the construction of road works and earthworks.

Since the 2000s it has been working assiduously in the environmental field and offers its services on the national and international territory, carrying out multiple types of intervention:

1. Volumetric recovery in active, depleted or exhausted landfills;
2. Functional safety of disused landfills;
3. Environmental reclamation, protection and remediation works and plants;
4. Construction and management of landfill plants for municipal solid waste as such and/or treated;
5. Design and construction performance;
6. Provision of specific services.



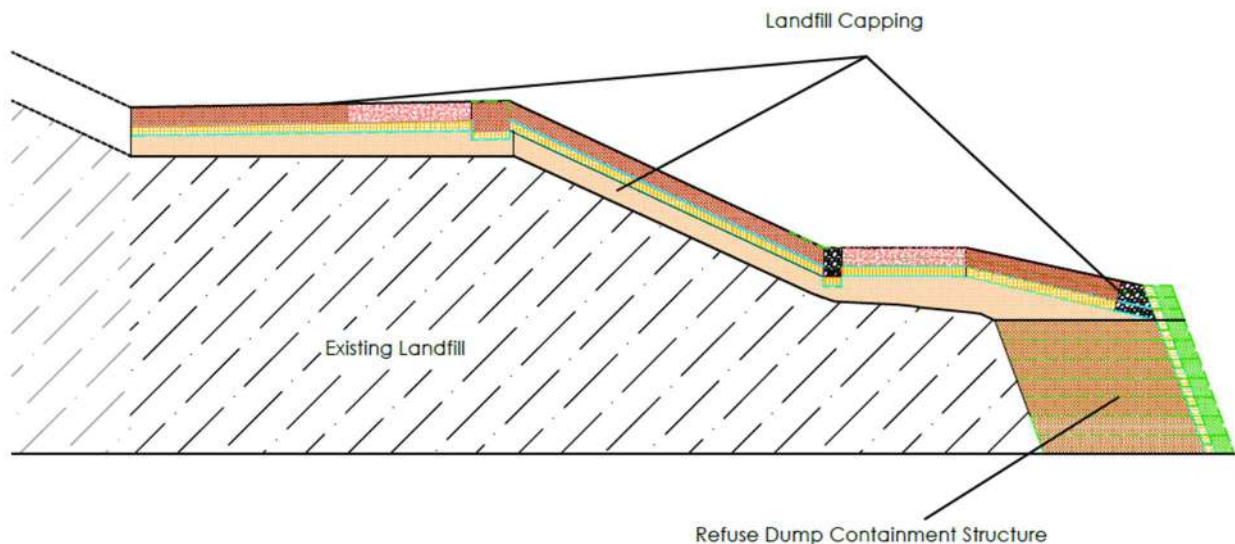
It has grown thanks to the active collaboration of a qualified internal technical staff, which has made it possible to perfectly combine design performance with the implementation of innovative environmental interventions, aimed at an extensive



target of public and private companies and feasible thanks to the considerable specialization acquired in the construction of containment structures through the use of landfill waste, with consequent economic and environmental benefits.

OUR PATENTS

The use of "waste" as a resource was possible as a result of the ownership of the patent **"REFUSE DUMP CONTAINMENT STRUCTURE®"**, which can be implemented in some EU states by virtue of the **European Patent**. The experience gained in the implementation of this technique and the competitiveness achieved in the field of volumetric recovery in landfills through waste treatment, has allowed to achieve considerable technical skills and patent a **Production Process** for the valorization of waste, which is well combined with the previous one, entitled **"Processing Waste Treatment for the Construction of Containment Structures for Landfills"**. In addition, the **"REFUSE DUMP CONTAINMENT STRUCTURE®"** continues in the theme of environmental remediation, aiming not only at the definitive closure of the landfill complexes, through a marginal structure that joins and extends the shape of the existing patent, to the top part of the landfills by carrying out permanent **safety**, but also allows future **redevelopment** of the top part of the landfill, through a system of horizontal geogrids connected to each other and to the marginal structure, and replacing the vegetal soil with material of variable grain size (quarry and/or demolition residues). An example of the shape of the structure is represented in the following image.



Refuse Dump Containment Structure

CONSTRUCTION OF NEW LANDFILLS

Strengthened by the experience gained in the environmental field, the company specializes in the construction of new landfills using materials that allow plants to be carried out that are always in line with the high standards of safety and environmental protection required by current regulations.

Among the most prestigious works carried out in recent years, we note the **"construction of the R.S.U. disposal plant, at the service of the Mountain Community of Fortore Molisano (CB)"** and the **"construction of the IV sector of the landfill at the service of the Municipality of Matera - La Martella locality"**.

The following image shows the waterproofing of the non-reusable waste tank attached to the composting plant serving the Municipality of Matera, in the "La Martella" locality.



Waterproofing phase of the tank of the IV sector of the landfill

Below is an overview of the completed intervention.



ACTIVITIES IN ITALY

VOLUMETRIC RECOVERY INTERVENTIONS IN THE PROVINCE OF FOGGIA

The company's strength is the technical skills in waste processing that allow the creation of containment structure and/or separation in batches, inside landfills where it is necessary to continue cultivation by means of altimetric or plano-altimetric expansion. Such interventions are also possible in sites located on orographically complex areas or of limited size that would not justify the expansion due to the modest volumes deriving from it.

In fact, the **patented containment structure** that the company uses for this purpose is a useful part of the volumetric increase of the expansion, as it **consists of 90% of the waste** already deposited in landfills; the remaining **10%** is, instead, used for the preparation of an **external closure package in compliance with European Directive 1999/31/EC (IT D.Lgs. n°36/2003)**.

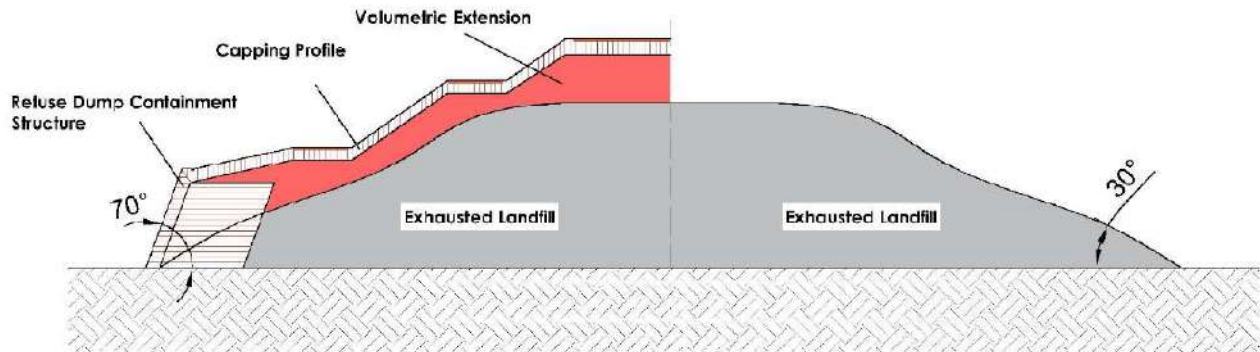
The intervention therefore avoids the usual elevation by means of a double-faced perimeter wall, consisting of terrigenous materials of various kinds to be transported on site, and occupying enormous volumes due to the modest slope of profiling imposed by the natural embankments (30°÷40° at best).



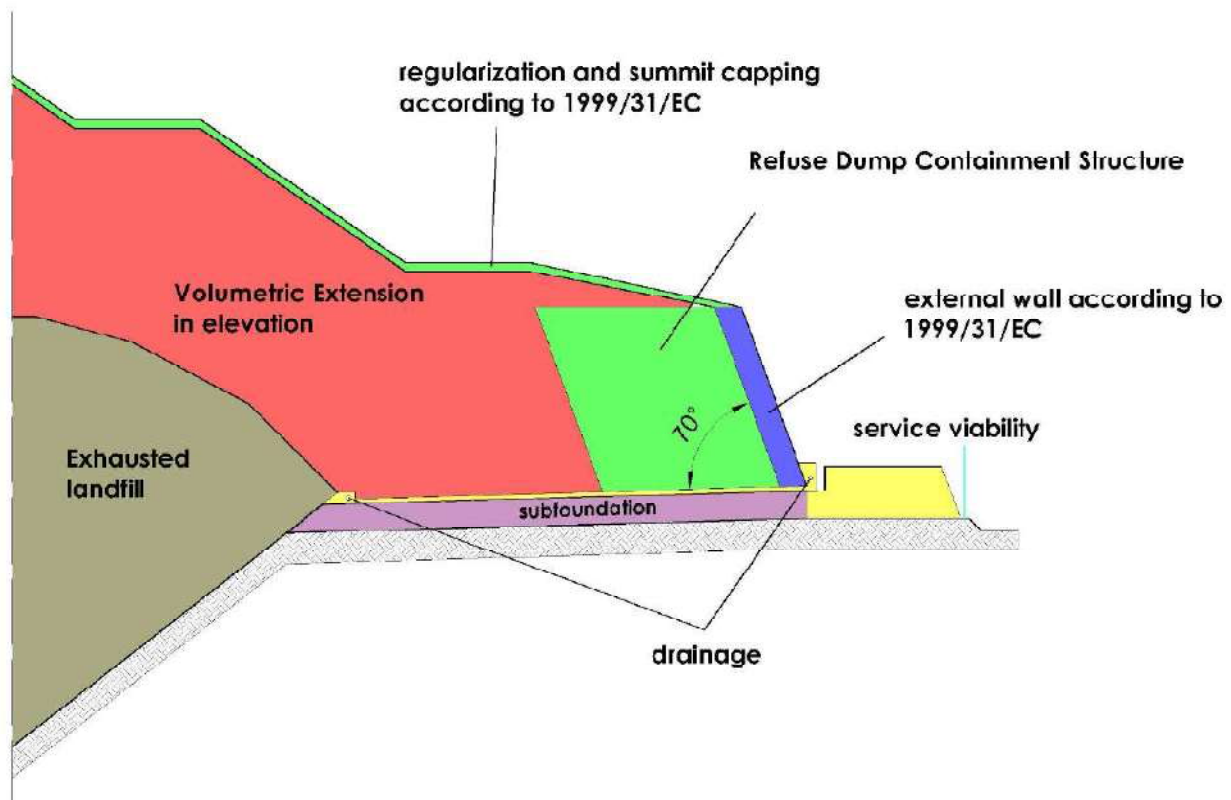
Consolidation by volumetric recovery of the South-East side of the "Pariti 2" landfill of Manfredonia (FG)- Overview of the initial state and final state



The patented technique, on the other hand, makes it possible to create stable confinement barriers with a single face having a **70° profile**, which are well suited to landfills located on irregular slopes, with embankment development or having an amphitheater basin configuration and open on several fronts. A graphic example of the shape of the volumetric expansion structure is illustrated in the image below, in which the exhausted landfill is represented on the right side with the shape of the normal earth embankment, on the left the structure of the patent.



Patented Structure Shape for Volumetric Recovery and Safety Work



Intervention Type Section



Elevation of the "Passo Breccioso" landfill in Foggia – Angle view of "Refuse Dump Containment Structure"

In the Passo Breccioso landfill in Foggia, the guaranteed elevation expansion of the "Refuse Dump Containment Structure®" patent of the original landfill basin has made it possible to recover considerable volumes.

The implemented volumetric recovery system combines the formation of the external containment structure with a well-structured road system to allow the maintenance of the landfill body, the regular environmental monitoring of the area and the control of the body itself.



Overview of the construction of the containment structure and the viability in the "Passo Breccioso" landfill in Foggia

ACTIVITIES ABROAD

THE VOLUMETRIC RECOVERY OF THE MALTA LANDFILL

The activities present on the island as well as its identification as a tourist destination, involve the production of large quantities of waste. The serious condition of waste production and the impossibility of obtaining plots of land useful for disposal, have led the Maltese State, through the company **WasteServ Ltd**, to request the collaboration of **FRISOLI S.R.L.**, on the strength of its European patent, to ensure the continuation of the disposals within the plant, avoiding the occupation of further land with a new plant.

The company has signed a first contract concluded in autumn 2023 with the subject "**Project for the alteration of the Ghallis landfill profile to extend the landfilling capacity**", in particular *Works to expand the containment capacity of its recycling centre located in the locality of Maghtab (now the Ecohive complex), more precisely the Ghallis landfill – waste handling and compaction activities*

which has allowed a volumetric recovery of about **315,000 m³** in the east/south area.



Detail of the recovery intervention in the Ghallis landfill, Ecohive Complex, Malta

The work carried out has made it possible to sign a new contract with the subject "**Project for the alteration of the Ghallis landfill profile to extend the landfilling capacity called FRISOLI 2 – Phase 2**", with a further volumetric recovery that will reach a total of **1.000,000 m³**.

Currently, the company continues its work on Malta, through the aforementioned contract in the Ghallis landfill, along the south/south-east part up to the northern area, continuing the waste disposal and construction of the containment structure, ensuring efficiency in patent techniques and obtaining an **optimal compaction index** (over 1 tons/m³) constantly saving ground in extension, combining labor efficiency with wise use of machinery.

The main part of the works is the expansion of the Ghallis landfill through the "**Refuse Dump Containment Structure®**", east side, south-east. The works involved the initial identification of the bottom of the landfill basin with recovery and connection of the pre-existing HDPE waterproofing sheet with a new flap laid on a prefabricated concrete perimeter wall of the "**T – Wall**" type. This wall has the function of supporting the basic drainage of the structure for proper management of rainwater and acting as an anchor point for the geosynthetic/geocomposite system that constitutes the environmental barrier of the structure in the deep portion.



List of jobs in the photographic scheme:

- 1) Search for the existing HDPE sheet;
- 2) Laying bentonite sheet;
- 3) HDPE sheet laying;
- 4) Laying non-woven fabric.



Foundation of the "**Refuse Dump Containment Structure®**".

The subsequent filling of the perimeter landfill basin to the internal body, consisting of bales of waste, was planned up to the impost floor, which allowed the formation of the foundation of the structure. This foundation is structured as a drainage plywood that allows the accumulation and conveyance of leachate into the collection system. Then we have the patented structure which, as already described above, in the image "d) Schematization of the external facing of the containment structure" complies with European legislation, in particular Directive 1999/31/EC on the closure of waste landfills. The use of geosynthetic materials allows the saving of volumes and guarantees, thanks to the technical properties of the materials, the conveyance of the various fractions such as biogas and rainwater to the appropriate collection channels.

The elevated structure involved the same techniques as the works carried out in the municipality of Foggia.



Formation of the containment structure of the Malta landfill - south/south - east side

The other processes are almost the same after the geological conformation of the territory and the product characteristics of the waste.

... NOT ONLY VOLUMETRIC RECOVERY, BUT

... MANY OTHER BENEFITS

PROGRESSIVE FINANCEABILITY

Unlike similar interventions that require an impulsive initial cost, as they must be completely carried out before allowing the start of the embankments, our system requires an executive progress in parallel with the embankment of the waste, which obviously entails a considerable financial elasticity in covering the costs.

OPERATIONAL IMMEDIACY

The beginning of the elevation embankments is therefore contextual to the authorization process.

FLEXIBILITY OF INTERVENTION

Our system is always applicable, even being "unique" in the case of reactivation interventions, even partial, and exhausted landfills. Flexibility is particularly appreciated in landfills hosting ecobales.

ENVIRONMENTAL PROTECTION

The external facing of the banks of the structure consists of a stratified closure package in compliance with European Directive 1999/31/EC which allows the envelope created since its executive phase to be adapted to the closure.

COMPETITIVE COSTS

The intervention is highly competitive and unique by virtue of the "depreciation" linked to the considerable greater volumes it makes available and the reduced closing, management and post-management costs that it entails

OUR SPECIFIC SERVICES

The company has a proven technical staff able to offer **design services** related to the sectors of intervention represented below. This provides competence and the ability to solve the different situations that may arise, to the right support and completion of the activities carried out and proposed.

In particular, the following are performed:

1. Design of new landfills and/or extensions of existing landfills;
2. Projects for the reclamation and/or environmental restoration of degraded areas (in particular, resolution of environmental emergencies);
3. Studies and plant proposals aimed at volumetric recovery in active landfills or close to exhaustion;
4. Feasibility studies concerning the "safety" of old disused landfills through stabilization and consolidation of the fronts;
5. Residual volumetric surveys and analyses.

By virtue of the experience gained, it carries out the **management** of landfills for municipal waste as it is or treated, which can be integrated, in support of disposal activities, through the waste process activities applied through the adoption of patents.

COMPANY CERTIFICATES AND REQUIREMENTS

The Company is in possession of "**Certificate of Qualification for the Execution of Public Works – SOA**" n° 30442/11/00 for the categories listed below, with reference to the mandatory qualification according to the SOA D.P.R. Regulation of 8 June 2011 n. 207 (amendments to the D.P.R. of 25 January 2000 n. 34), issued by "SOA Group S.p.A."

CERTIFICATION	CATEGORY AND CLASS	DESCRIPTION
SOA Certification	Categoria OG12	<i>Reclamation and environmental protection works and plants for unlimited amounts</i>
	Class VIII	
SOA Certification	Categoria OG12	<i>Qualification for design and construction performance</i>
	V-Class	

Certifications of the **International Standardization Organization** issued by "AENOR CONFIA S.A.U.":

CERTIFICATION	ID	DESCRIPTION
Environmental Management Systems	ISO 14001:2015	<i>Construction of reclamation and environmental protection works and plants, including through special structural works and containment structures for landfills (IAF Sector:28)</i>
	GA – 2016/0198	
Quality Management Systems	ISO 9001:2015	<i>Design and execution of environmental remediation and protection works and plants (IAF Sector:28)</i>
	ER – 0516/2024	

Registration in the "**NATIONAL REGISTER OF ENVIRONMENTAL MANAGERS**" - Puglia Regional **Section** pursuant to art. 212, paragraph 8, of Legislative Decree No. 152/06:

CERTIFICATION	CATEGORY AND CLASS	DESCRIPTION
Registration	9 – B	Site remediation up to € 9,000,000
Registration	8 – F	Brokerage and trade of waste without holding waste

OUR GOALS

ISWA WELCOMES FRISOLI S.R.L AS A NEW SILVER MEMBER

JANUARY 28, 2025 | [ISWA NEWS](#)



ISWA is pleased to welcome **FRISOLI s.r.l.** as our latest Silver Member.

FRISOLI s.r.l. has been involved in the management of sanitary landfills since the early 2000s, through the application of Italian and European patents for the "**Refuse Dump Containment Structures®**". The considerable technical skills allow Frisoli s.r.l. to face significant challenges, such as the ongoing project in **Malta**, where works are underway to recover the volumes of the "**Ghallis Engineered Landfill**" located at WasteServ Malta Ltd ECOHIVE Complex, Tul il-Kosta, Naxxar NXR9030. In fact, with the project:

"**Ghallis Landfill Profile Modification Project to Expand Landfill Capacity**", the ultimate goal is to deposit over 1,000,000 tons of municipal waste in the part of the landfill that cannot be used with traditional landfill methods.

"With the entry into the company of the fourth generation of entrepreneurs, the future mission of Frisoli s.r.l. will be to further strengthen its international activities, focusing on markets where it is possible to provide innovative solutions for the resolution of consolidated environmental problems. Joining ISWA represents not only an important opportunity for prestige for the company, but also an opportunity for the new generations of entrepreneurs to develop international relationships, thus promoting the dissemination of our patents and our technical skills in collaboration with other local authorities operating in the waste management sector".

Ciro Frisoli – Legal Representative

ISWA membership is open to individuals and organizations from the scientific community, public institutions and public and private companies from all over the world that operate in the sector or are interested in waste management. As the only global waste association with members in 110 countries, ISWA allows you to network with professionals, companies and institutional representatives on a global scale. ISWA's unique mix of members spans the entire waste industry for the promotion and development of sustainable waste management worldwide.