Terraces of Cyprus

Dry-Stone Construction & Terrace Management

Technical School Edition

Developed from material

TERRACT

Prepared by

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Terraced landscapes represent one of the most efficient traditional slope-management systems in the Mediterranean region.

This technical edition examines the engineering principles, construction methods, maintenance requirements and modern applications of dry-stone terrace systems in Cyprus.

The aim is to connect traditional craftsmanship with contemporary environmental and construction practices.



Biennale Architecture 2025, Venice,
Cypriot Pavilion
Photo by Demetris Loutsios

PREFACE

By the end of this module, students should be able to:

- Identify the structural components of a terrace system
- Explain dry-stone wall engineering principles
- Analyze drainage and soil stabilization mechanisms
- Conduct a basic terrace condition assessment
- Propose maintenance and reinforcement solutions
- Evaluate terraces as environmental infrastructure
- To reinforce this learning through practical application.



The project was presented in the framework of the Limassol stopover of the Art Explore Festival, curated by The Island Club.
Photo by Demetris Loutsios, Art Explora Festival Limassol, 2025

LEARNING OBJECTIVES

Terraces in Cyprus were developed as adaptive responses to:

- Steep topography
- Limited arable land
- The need for stone removal from fertile land.
- Seasonal rainfall patterns
- Soil erosion risk

Over centuries, builders refined structural methods through empirical observation and practical experience.

These systems function as gravity-based retaining structures without mortar.



ETL 2023 Kamilostrata, Salamiou Village
Photo by Sevina Floridou

HISTORICAL ENGINEERING CONTEXT

A complete terrace system consists of:

Foundation base (larger stones)

- Retaining wall (dry-stone structure with facing stones)
- Drainage layer with packing small and irregular stones
- Backfill soil layer
- Cultivation surface

Each component contributes to overall structural stability and environmental performance.

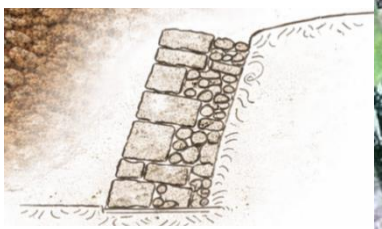


Diagram 1: Dry Stone Wall and its components by Panayiotis Panayiotou

Stone mason Andreas Ioannou
ETL 2025 Distrata, Salamiou



STRUCTURAL COMPONENTS OF A TERRACE

Dry-stone retaining walls function through:

- Mass (self-weight)
- Friction between stones
- Interlocking placement

Unlike rigid concrete walls, dry-stone walls are flexible structures that can absorb minor ground movement.



Stone Mason Panayiotis Panayiotou at the Biennale Architecture, Cypriot Pavilion 2025, Venice
Photo by Vassiliki Petropoulou Panayiotou

Proper foundation preparation is critical.

Best practices include:

- Excavating to stable subsoil
- Removing loose organic material
- Leveling the base with a slight inward slope
- Placing the largest stones at the bottom

Failure at foundation level leads to progressive structural instability.



Stone Mason Argyris Panayiotou
at Distrata during ETL 2025
Photo by Sevina Flotidou

FOUNDATION PREPARATION

Stone selection criteria:

- Density and durability
- Angular geometry for interlocking
- Size appropriate to wall height

Construction principles:

- Largest stones at the base
- Through-stones to tie wall faces together
- Smaller infill stones to eliminate voids
- Avoid vertical joint alignment

Correct placement distributes load evenly.



Lagria Winery ETL 2025
Photo by Vassiliki Petropoulou

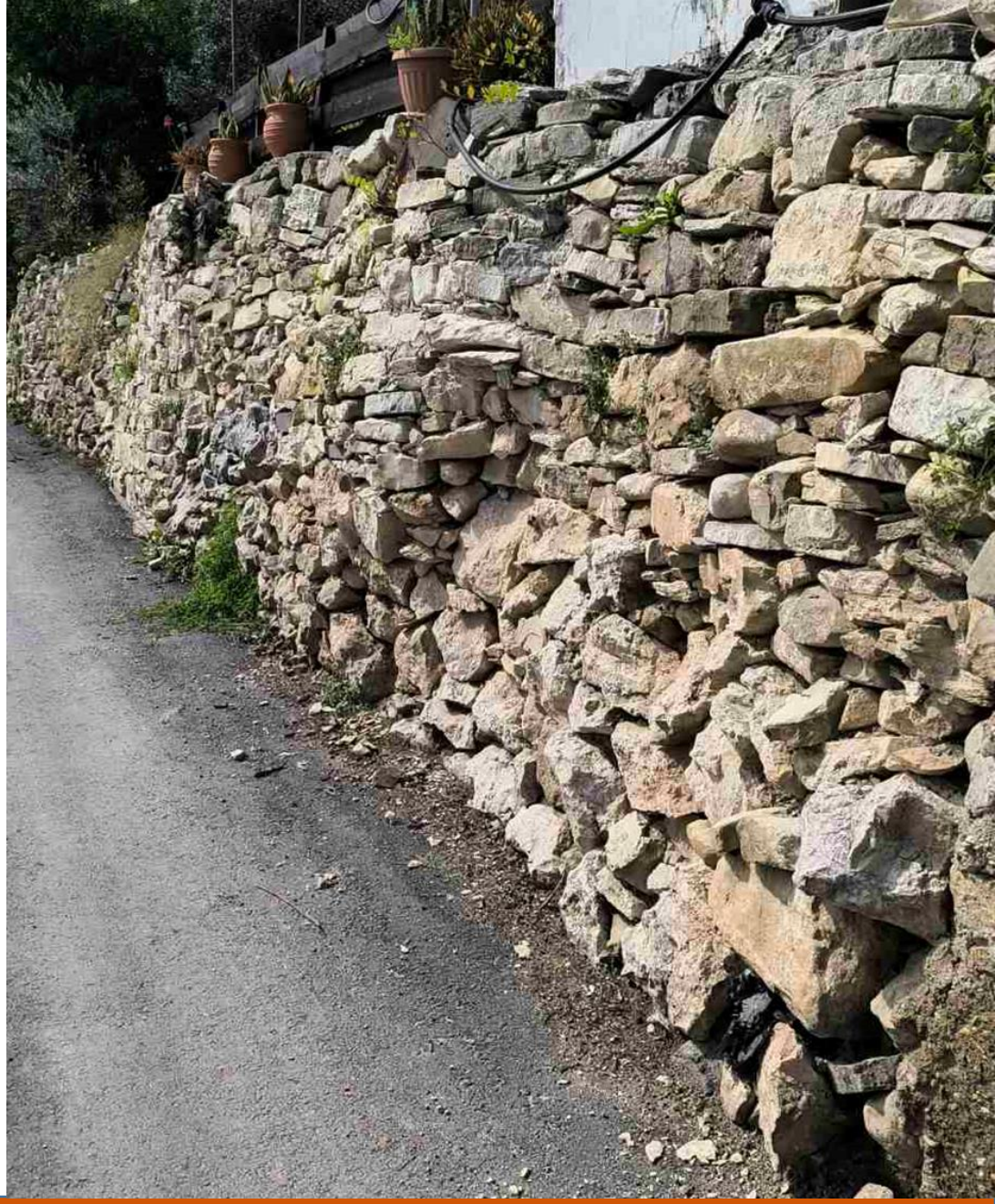
STONE SELECTION AND PLACEMENT

Walls must lean slightly inward (slope of approximately 5–15%).

This improves:

- Load distribution
- Resistance to overturning
- Structural cohesion

Incorrect batter increases risk of outward bulging.



Bulging
Photo by Panayiotis Panayiotou

Drainage is the most critical factor in terrace longevity.

Hydrostatic pressure from trapped water is the primary cause of wall failure.

Effective drainage requires:

- Permeable backfill
- Small stone infill
- Natural weep gaps
- Proper surface runoff management

Water must move through — not against — the wall.



Stone Mason , Andreas Christodoulou
ETL 2025 Distrata, Salamiou
Photo by Vassiliki Petropoulou Panayiotou

Backfill soil must be:

- Compacted in layers
- Free of excessive organic debris
- Properly graded for surface runoff

Terraces function as controlled soil-retention platforms.

Improper soil management leads to settlement and wall deformation.



ITLA Italy President Donatella Murtas, Distrata ETL 2025
Photo by Vassiliki Pettropoulou Panayiotou

Terraces act as distributed retaining structures across a slope.

They:

- Reduce slope angle
- Break runoff velocity
- Increase infiltration
- Reduce landslide probability

They function similarly to stepped retaining systems in modern civil engineering.



ITLA President Timmi Tilllmann
Kamilostrata EDTL 2023
Photo by Carolina Teodorescou

TERRACE AS A SLOPE STABILIZATION SYSTEM

Key structural forces include:

- Vertical load from soil weight
- Lateral earth pressure which increases due to water retention
- Surface surcharge loads

Understanding these forces is essential for safe construction.



Sevina Floridou, architect- researcher
Photo by Demetris Loutsios, Art Explora Festival
Limassol, 2025

LOAD AND PRESSURE CONSIDERATIONS

Typical failures include:

- Wall bulging
- Toe displacement
- Not enough through-stones
- Foundation settlement
- Vegetation root intrusion

Early detection prevents total collapse.



Distrata, Salamiou
Photo by Yiannis Hadjittofis

Annual inspection checklist:

- Check for wall alignment changes
- Inspect drainage paths
- Remove invasive vegetation
- Replace displaced stones
- Repair minor bulges immediately

Preventive maintenance extends wall life significantly.



Distrata, ETL 2025
Photo by Sevina Floridou

MAINTENANCE AND INSPECTION PROTOCOL

Restoration principles:

- Dismantle unstable sections carefully
- Reuse original stones when possible
- Rebuild using correct slope
- Reconstruct drainage layer

Avoid introducing rigid cement unless structurally required and justified.

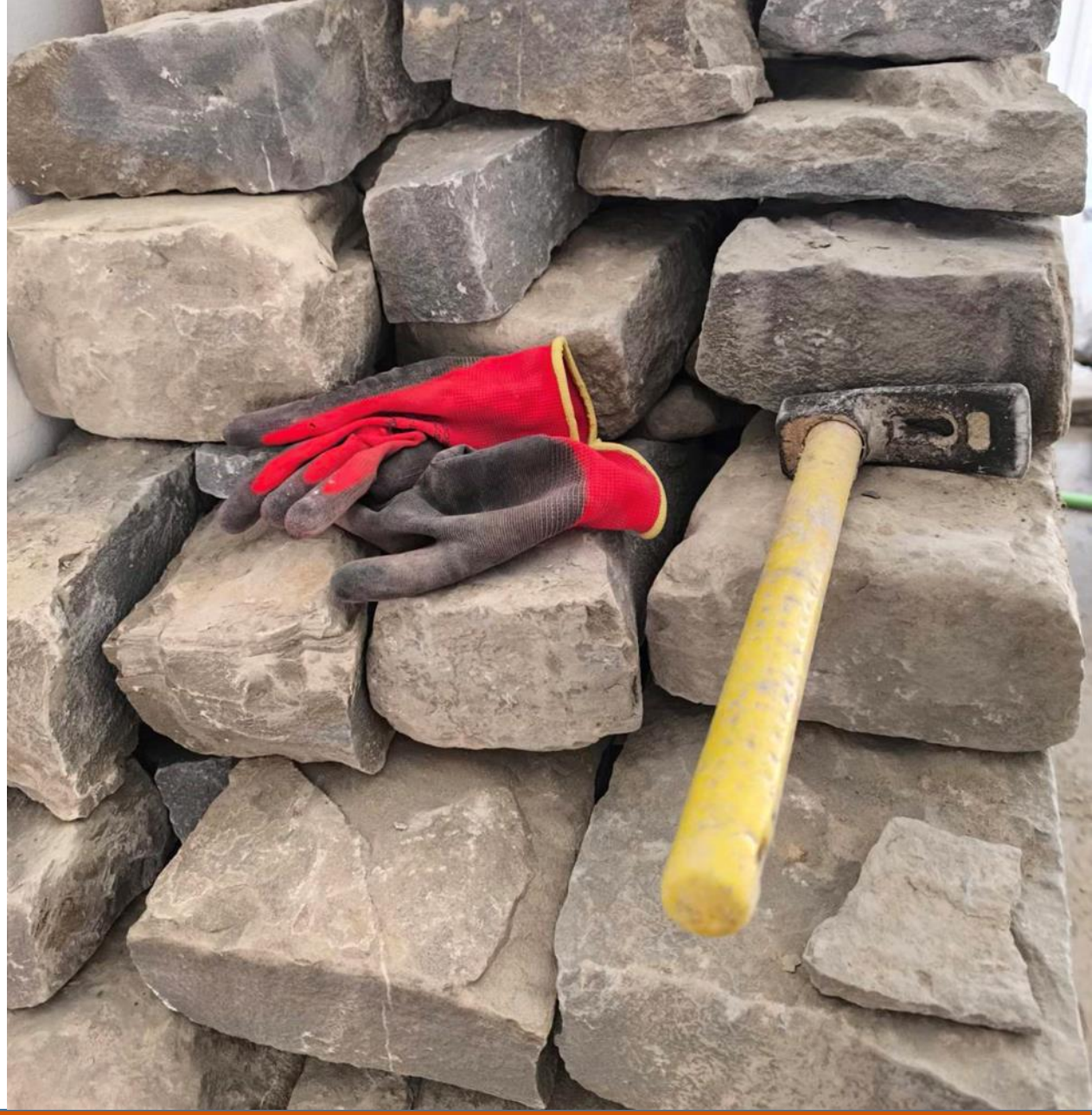


Biennale Architecture 2025, Venice, Cypriot Pavilion
Photo by Demetris Loutsios

During construction or restoration:

- Use protective gloves and footwear
- Ensure stable lifting techniques
- Avoid unstable wall sections
- Monitor slope conditions

Dry-stone construction involves manual handling risks.



Biennale Architecture 2025, Venice, Cypriot Pavilion
Photo by Vassiliki Petropoulou Panayiotou

SAFETY CONSIDERATIONS

Terraces contribute to:

- Soil conservation
- Firebreak formation
- Biodiversity support
- Water management
- Microclimate regulation

They represent low-carbon infrastructure solutions.



Living Terraced Landscape
Photo by Glyn Edwards

Under increasing climate variability, terraces:

- Reduce flood intensity
- Improve drought resilience
- Prevent erosion after extreme rainfall

They align with nature-based adaptation strategies promoted in European environmental frameworks.



Xeros River Valley
Photo by Andri Kedariti

TERRACES AND CLIMATE ADAPTATION

Dry-stone principles are relevant to:

- Landscape architecture
- Sustainable drainage systems
- Green infrastructure design
- Erosion control engineering

Hybrid systems combining traditional and modern methods are increasingly explored.



Biennale Architecture 2025,
Venice, Cypriot Pavilion
Photo by Demetris Loutsios

INTEGRATION WITH MODERN ENGINEERING

Skills related to terrace systems apply to careers in:

- Construction trades
- Environmental engineering
- Landscape contracting
- Heritage restoration
- Sustainable agriculture

Technical knowledge of dry-stone systems has growing market value.



Wine Packages
Photo by Yiannis Hadjittofis



Terract initiative
Apostolic Olive Trees Project with volunteers since 2018
Photo by Vassiliki Petropoulou Panayiotou

ECONOMIC AND PROFESSIONAL RELEVANCE

Exercise 1:

Sketch a cross-section of a terrace including:

- Foundation
- Retaining wall
- Drainage layer
- Soil backfill

Exercise 2:

Identify potential failure points in a damaged wall scenario.

Exercise 3:

Propose reinforcement solutions without using cement.



Biennale Architecture 2025, Venice, Cypriot Pavilion
Photo by Demetris Loutsios

PRACTICAL WORKSHOP EXERCISE

Conduct a site visit and evaluate:

- Wall height,width and batter
- Stone condition
- Drainage functionality
- Vegetation impact
- Signs of structural stress

Prepare a short technical report with recommendations.



Panayiotis and Argyris Panayiotou
Dry Stone Wall Construction
Biennale Architecture 2025, Venice, Cypriot Pavilion
Photo by Vassiliki Petropoulou Panayiotou

Traditional Engineering for Modern Challenges

Terraced landscapes demonstrate that effective engineering does not always require industrial materials.

Through gravity, geometry and craftsmanship, dry-stone systems have stabilized slopes for centuries.

For technical students, terraces offer a valuable case study in:

- Sustainable construction
- Low-impact engineering
- Climate-resilient infrastructure
- Practical structural analysis

The integration of traditional knowledge with modern technical training ensures that this expertise remains relevant in the future built environment.



Biennale Architecture 2025, Venice,
Cypriot Pavilion
Photo by Vas Petropoulou Panayiotou



ETL 2025 Distrata Salamiou
Photo by Sevina Floridou

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