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An Introduction to Ballast Blocks

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Ballast Blocks are precast concrete units designed to provide stabilising weight without permanent ground fixings

Commonly used where structures require resistance to:

- Wind uplift
- Sliding
- Overturning
- Temporary loading
- Dynamic loading

Typical applications include renewable energy, utilities, temporary structures and infrastructure

What are Ballast Blocks?

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- Solar farms
- Battery Energy Storage Systems (BESS)
- CCTV columns
- Traffic management
- Temporary structures
- Marquees
- Telecommunications
- Utility installations
- Event management
- Security fencing
- Signage
- Highways

Where are Ballast Blocks used?

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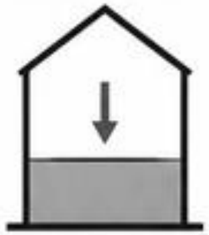
Ballast works by resisting:

- Uplift
- Sliding
- Rotation
- Lateral movement

The project designer must ensure the ballast exceeds all imposed loads with suitable safety factors

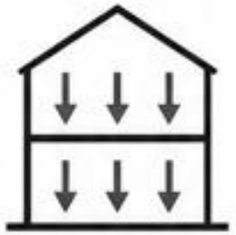
TYPES OF LOADS
IN STRUCTURAL DESIGN

DEAD LOADS



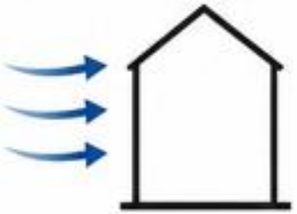
Permanent, stationary loads from the weight of the structure and fixed components.

LIVE LOADS



Variable loads from occupancy, furniture, equipment, people, etc.

ENVIRONMENTAL LOADS (WIND LOAD)



Forces exerted by wind pressure acting on the structure.

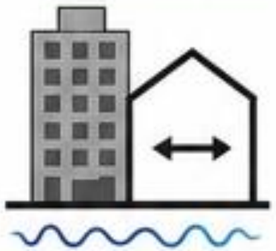
ENVIRONMENTAL LOADS (SNOW LOAD)

Load due to the accumulation of snow on the structure.

HYDROSTATIC LOAD

Pressure exerted by stationary water on the structure.

DYNAMIC LOADING



Loads that vary with time due to moving forces such as earthquakes, traffic, machinery, or vibrations.

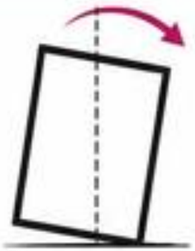
IMPACT LOADING

Sudden, short-duration forces resulting from collision, falling objects, or blasts.

UPLIFT FORCES (NEGATIVE LOAD)

Upward forces acting on the structure, causing suction or lift (e.g., wind uplift, buoyancy).

OVERTURNING MOMENT



Moment caused by lateral forces that tend to overturn or rotate the structure about its base.

Typical Forces Acting on Structures

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Wind is usually the governing design load

Factors include:

- Building height
- Structure geometry
- Exposure category
- Terrain
- Wind speed
- Gust factors

Reference BS EB 1991-1-4 Eurocode 1 Actions on Structures – Wind Actions

Forces travel through:

- Wind
- Structure
- Support frame
- Ballast blocks
- Ground

Understanding the complete load path is essential for safe design

Load Paths

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The required ballast depends on:

- Wind loading
- Dead load
- Foundation friction
- Ground bearing pressure
- Centre of gravity
- Height
- Shape
- Structural stiffness

Factors Affecting Ballast Requirements

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Typical design process:

- Determine design loads
- Calculate overturning movement
- Calculate resisting moment
- Apply partial safety factors
- Select appropriate ballast weight
- Verify ground bearing pressure

Calculating Ballast Weight

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Equipment weight: 2 tonnes

Wind uplift: 18kN

Safety factor: 1.5

Required resisting force: 27kN

Equivalent ballast: Approx. 2.75 tonnes

Actual design should always be undertaken by a suitably qualified engineer

Example calculation

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Ground conditions influence ballast performance

- Bearing capacity
- Settlement
- Groundwater
- Slope
- Frost
- Drainage

Poor ground may require larger footprints rather than heavier blocks

Ground conditions

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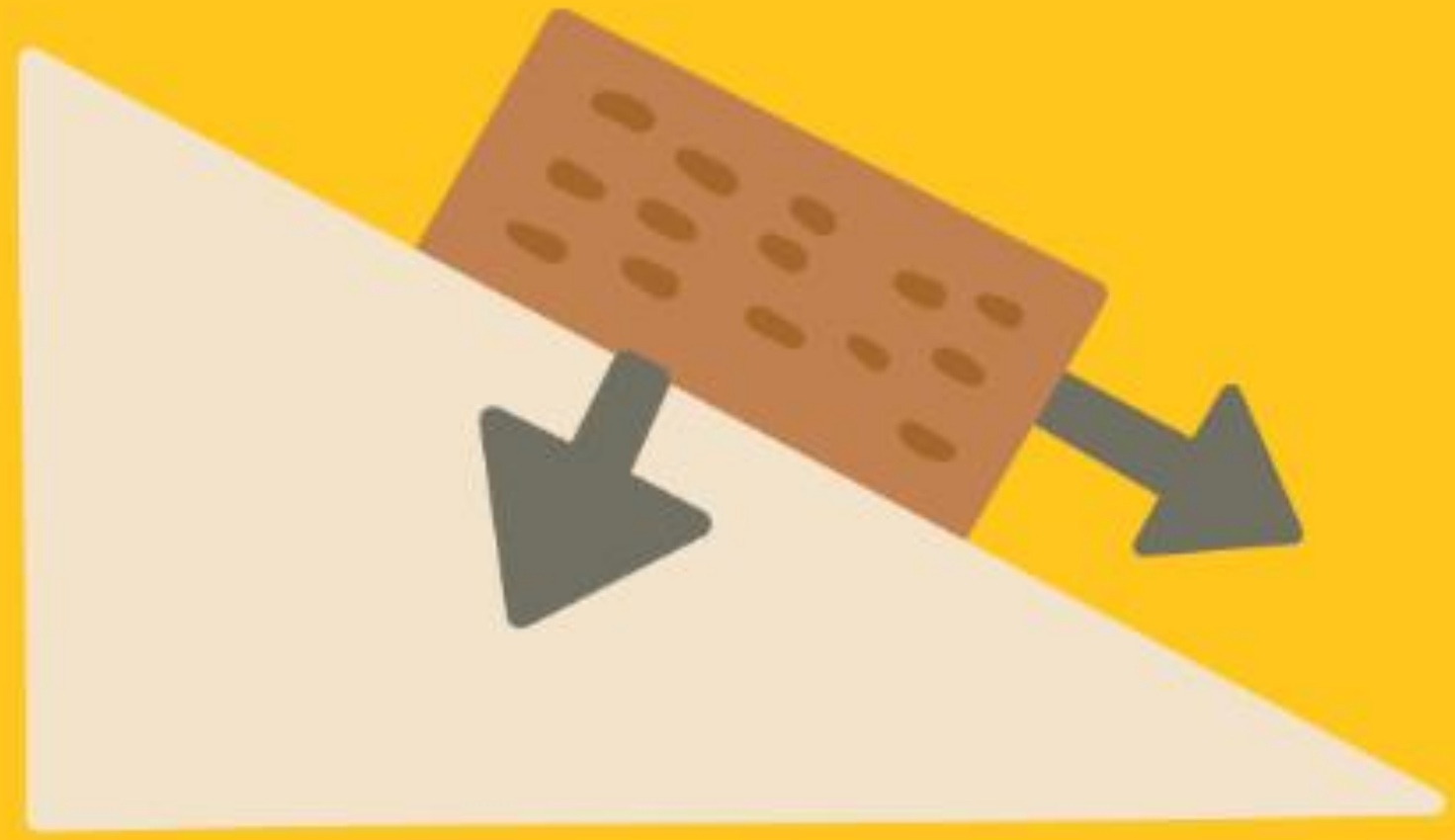
Design should consider

- Dry conditions
- Wet conditions
- Loose material
- Gravel
- Asphalt
- Concrete



Friction

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- ISO accredited factory made
- ISO accredited quality control
- Consistent strength
- Immediate installation
- Long service life
- No curing time
- Reusable
- Minimal maintenance
- Sustainable
- Reduced waste

Precast concrete advantages

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- Ballast Blocks
- Counterweight Blocks
- Solar Ballast
- CCTV Foundation Blocks
- Mobile Post Blocks
- Marquee Weights
- Sea Anchor Blocks
- Kentledge Blocks
- Kelly Blocks
- Transformer Foundation Blocks

Elite Precast Ballast Solutions

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Applications

- Ground-mounted solar
- Battery energy storage
- EV charging infrastructure
- Grid substations
- Wind energy

Benefits

- No ground penetration
- Quick installation
- Easily removal
- Reduced environmental impact

Renewable Energy

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Benefits

- Rapid deployment
- No concrete pours
- Reduced programme times
- Lower environment disturbance
- Excellent for brownfield sites
- Ideal for temporary installations
- No ground penetration
- Easy to remove
- Reduced site wastage

Solar Ballast

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Applications

- Construction sites
- Highways
- Rail
- Utilities
- Commercial premises

Benefits

- Quick installation
- Relocatable
- Minimal excavation

CCTV Foundation Bases

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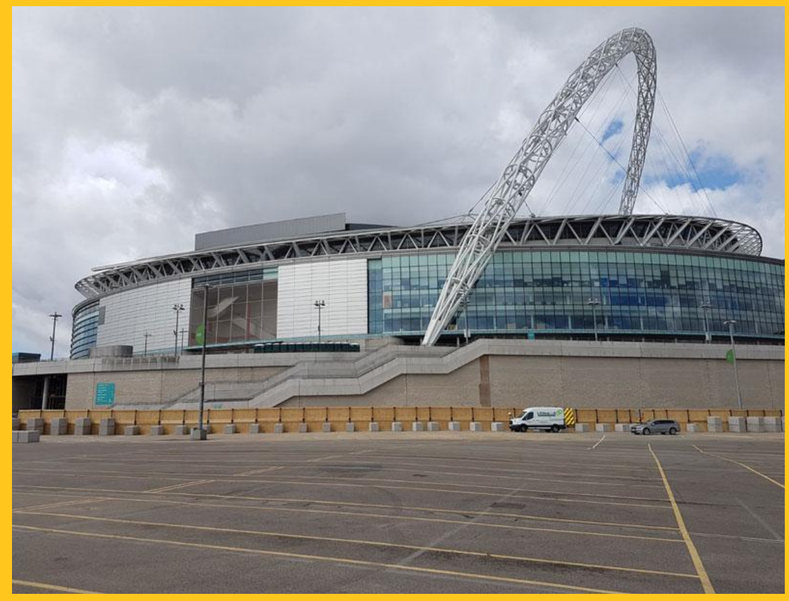
Suitable for:

- Events
- Festivals
- Traffic management
- Temporary compounds
- Construction sites
- Rail infrastructure
- Security barriers
- People safety
- Leisure facilities
- Royal occasions



Temporary Infrastructure

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Applications:

- Buoys
- Pontoons
- Marinas
- Sea anchors
- Harbour infrastructure
- Leisure facilities
- Canals
- Rivers
- Marinas

Waterways

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Always:

- Use certified lifting points
- Inspect lifting equipment
- Use suitable plant
- Install onto prepared ground
- Follow lifting plans
- Inspect blocks before use
- Inspect after placement

Installation Best Practice

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Health & Safety

Lifting plans
Ground stability
Overhead services
Temporary words
Site traffic
Exclusion zones
Competent workforce
Delivery schedules

Sustainability

Long service life
Reuse
Relocation
Reduced excavation
Reduced waste
Lower maintenance
Recyclable
Reduced carbon from site movements

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- Underestimating wind loads
- Ignoring uplift
- Insufficient friction
- Poor ground assessment
- Incorrect lifting arrangements
- Inadequate safety factors
- Using unverified block weights
- Using unregistered suppliers

Common Design Mistakes

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Want to know more?

- BS EN 1990 – Basis of Structural Design
- BS EN 1991-1-4 – Eurocode 1: Wind Actions
- BS EN 1992-1-1 – Eurocode 2: Design of Concrete Structures
- BS EN 206 – Concrete: Specification, Performance, Production and Conformity
- BS 8500 – Complementary British Stants to BS EN 206
- CIRCI C703 – Guide to Temporary Works
- Temporary Works Forum (TWF) guidance