



From plant to port

Transporting cement is a critical process in the construction industry, ensuring that this vital material reaches its destination without compromising its quality. The choice of transportation method depends on factors such as distance, capacity requirements, and infrastructure availability. This article explores various methods of transporting cement, frequently used in combination with storage facilities, highlighting their advantages and limitations. Their applications are connected to site geometries, geography, and user preferences.

When approaching a new project involving cement transportation as part of a full EPC (engineering, procurement, and construction) contract, Euromecc always starts with a site visit and customer interview. These steps are essential for determining the most efficient solution and accommodating all operational

Daniele Sciuto, Euromecc Srl, covers the different cement transport methods that can be adopted when designing a new terminal facility.



and background requirements. They also help define the main features of the installation, such as material flow to the storage, and the required equipment to be reached or loaded after storage, such as vessels, trains, or bulk tankers, each influencing the selection of the best transportation method.



Pneumatic transport is the easiest means of transportation when cement is delivered by a self-discharging vessel. It minimises the infrastructure and protects the customer in the event of demurrage costs.



Pneumatic pipes facilitate the following of special routings and can be used either in dense or fluid phases.



To compensate the height requirement, it is common to use a bucket elevator in combination with airslides.

Pneumatic line transport

Pneumatic line transport is probably the most common and well-known system across the globe. This method uses compressed air to convey cement through pipelines and is effective for long-distance transportation but demands substantial investment in infrastructure and operational power. There are two main types of pneumatic transport:

- ▶ **Dense phase:** In dense phase pneumatic conveying, cement is transported at a lower velocity but higher pressure. This method is ideal for long distances as it reduces wear and tear on the pipeline and minimises segregation of the cement particles. However, it requires significant installation and operational costs due to the power needed for pumps or compressors.
- ▶ **Fluid phase:** Fluid phase pneumatic conveying involves transporting cement at higher velocities but lower pressures. It is suitable for shorter distances and requires less power compared to dense phase systems. However, it can cause more wear and tear on the equipment and may lead to particle segregation.

Airslides

Airslides, also known as aeration conveyors, are another efficient method for transporting cement. They utilise a thin layer of air to fluidise the cement, allowing it to flow easily down a slight incline. Key features of airslides include:

- ▶ **Low wear:** Airslides have minimal moving parts, resulting in low wear and maintenance requirements. This makes them highly durable and cost-effective in the long term.
- ▶ **High capacity:** They can handle large volumes of cement efficiently, making them suitable for high-capacity operations.
- ▶ **Inclination requirement:** One limitation of airslides is the need for a specific inclination angle (typically between 6° and 7°) to ensure the cement flows correctly. This often necessitates the cement feed to be elevated, which can be achieved using intermediate elements like bucket elevators.

Airslides are ideal for facilities where maintaining a consistent flow with minimal maintenance is crucial, despite the inclination constraints.

Screw conveyors

Screw conveyors are widely used for short-distance transportation of cement. They consist of a helical screw blade that rotates within a tube, moving the cement forward. The key aspects of screw conveyors include:

- ▶ **Inclined and horizontal transport:** Screw conveyors can transport cement both inclined (sometimes they can also operate vertically) and horizontally, making them versatile for different layout configurations.



When it is required to reduce maintenance and running costs, while transporting the material at high-rates, airslides are the best solution.



Screw conveyors guarantee high-flexibility from an operational point of view. They are popular in bulk loading stations, allowing silos to be installed at ground level without big frames or carrying structures.



Screw conveyors are strongly recommended in low level installations because they help to maintain the whole setup within specific limits, which can be set by permitting authorities.

- ▶ Limited capacity: They are generally suitable for moderate capacities and are not ideal for very high-volume operations.
- ▶ Higher wear: The mechanical action involved in moving the cement can lead to higher wear and tear on the equipment, necessitating regular maintenance and replacements.

Despite their limitations, screw conveyors are valuable for applications where flexibility and moderate capacity are required.

Belt conveyors

Belt conveyors are another common method for transporting cement, particularly in large-scale operations. They consist of a continuous belt that moves over pulleys, carrying the cement along its length. Key features of belt conveyors include:

- ▶ High capacity: Belt conveyors can handle large volumes of cement efficiently.
- ▶ Flexibility: They can be configured for long-distance transport and can navigate complex layouts with the use of transfer points.
- ▶ Moderate wear: While they experience wear and tear, modern materials and maintenance practices can extend their lifespan.

However, this method is not completely sealed, requiring an adequate dedusting unit and suitable measures to avoid any dust escape. This issue can be mitigated by using chain conveyors or redlers, which are typically enclosed.

Conclusion

Selecting the appropriate method for transporting cement is essential for maintaining its quality and ensuring efficient delivery to the intended destination. Pneumatic line transport, airslides, screw conveyors and belt conveyors each offer unique advantages and are suited to different operational needs and distances. When considering the installation of a new facility, it is always recommended to appoint an expert who can combine the specific requirements and constraints of each project, meet with construction and logistics managers, and select the most effective transportation method to ensure the smooth flow of cement throughout the supply chain. By doing so, the integrity and quality of the cement are preserved, contributing to the overall success of construction projects. ■

About the author

As an on-field sales specialist dedicated to Commonwealth and MENA regions for Euromecc srl, Italy, Daniele Sciuto is focused on the development of new projects from feasibility phases for independent and big corporations in the bulk materials industry. Daniele has a Mechanical Engineering background, and has been involved in the technical development, costing and sales of several terminal projects all around the world since 2012, when he joined Euromecc.