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**Sir Francis Drake Hotel**
**San Francisco, Ca., USA**

IN CO-OPERATION WITH CEMENT DISTRIBUTION CONSULTANTS


# NEW PROVIDENCE TERMINAL GLENS FALLS LEHIGH CEMENT COMPANY

**Mike Hunter**
**Director of Marketing**
**Domtec International**
**USA**

# Biography

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## Michael D. Hunter

Mike Hunter has been in the dome business for more than 20 years. Currently he is the Director of Marketing and a Managing Member of ***DOMTEC® International,*** constructing concrete domes worldwide primarily for the bulk storage applications, especially for the cement industry.

Hunter is a member of the American Concrete Institute. He has authored/presented papers at several trade conferences; and has written numerous articles which have been published in various trade journals serving the cement and other industries.

Professional Summary:

1995-present: Founder and managing member of *DOMTEC® International, L.L.C.*

1994-present: Founder and President of Domes International Corp. dba DOMTEC International

1989 - 1995: Co-founder and President of Dome Technology. Vice President of Allstar Industries, Inc..

1982 - 1989: In house sales representative for Monolithic Constructors, Inc. (concrete domes)

**Intercem Terminals Workshop - San Francisco**
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# Glens Falls Lehigh Cement Terminal in Providence, Rhode Island

Mike Hunter, *DOMTEC® International*

## Introduction

Glens Falls Lehigh Cement is a joint venture between Lehigh Cement (part of the Heidelberger group) and Dykerhoff Zement AG. Their new terminal in Providence, Rhode Island began operating in the spring of 2002. The terminal serves Glens Falls Lehigh's customers in Rhode Island, Western and Southern Connecticut and Eastern Massachusetts.

## General Description

The terminal receives cement from ships (up to 35,000 m. tonnes capacity) and/or from rail cars. The single dome storage has a capacity of 44,000 m. tonnes. There is room for a second dome when additional storage may be needed.

Glens Falls Lehigh Cement's barge mounted Fuller Kovako pneumatic ship unloader conveys the cement from the ship to the dome through two pneumatic lines at 400 mtph (200 mtph per line). The same unit also services GFLC's Cementon, New York terminal.

Cement is withdrawn from the dome by means of an Ibau fluidized floor reclaim system which feeds a bucket elevator just outside the dome structure. The bucket elevator is surrounded and supported by a stair tower, providing service access to both the elevator and the top of the dome. The elevator discharges into fluidslides which convey the cement into two 300 m. tonne capacity day bins. One bin is for loading trucks and the other is for either trucks or rail cars. The entire load out area is completely enclosed, and both dustless load out spouts are mounted above a scale. Having two truck load out lanes allows the terminal to support a large volume of trucks each day.

## Project Development

Glens Falls Lehigh Cement, assisted by Lehigh Valley Technical Associates, acted as it's own general contractor. Construction began early in 2001. Ramco Construction was contracted to build the dome. (Ramco is a union affiliated company owned by the same principals who own

*DOMTEC® International*.) Dimeo Construction did most of the other work, including civils, millwright, and building structures to house compressors, electrical equipment, and the totally enclosed load out structure. Ibau Hamburg designed and supplied the dome's reclaim system.

The dome silo is 42.4 meters (139 ft.) diameter by 34.1 meters (112 ft.) high, and has a capacity of 44,000 m. tonnes of cement. The dome's foundation consists of a simple spread footing. Since concrete domes are considerably tolerant of differential settlement costly pilings or other types of deep foundations were not necessary, even though much of the site is fill material.

This dome is relatively tall, including a 13 m (42.5 ft.) tall, near vertical section. Generally speaking taller domes cost more than shorter domes of the same capacity. When a fluidized floor reclaim system is used however, minimizing the floor area becomes important to the overall project cost. For domes with fluidized floor reclaim, a tall dome silo configuration usually yields the most economical overall combined cost of dome storage plus reclaim system.

## Concrete Domes

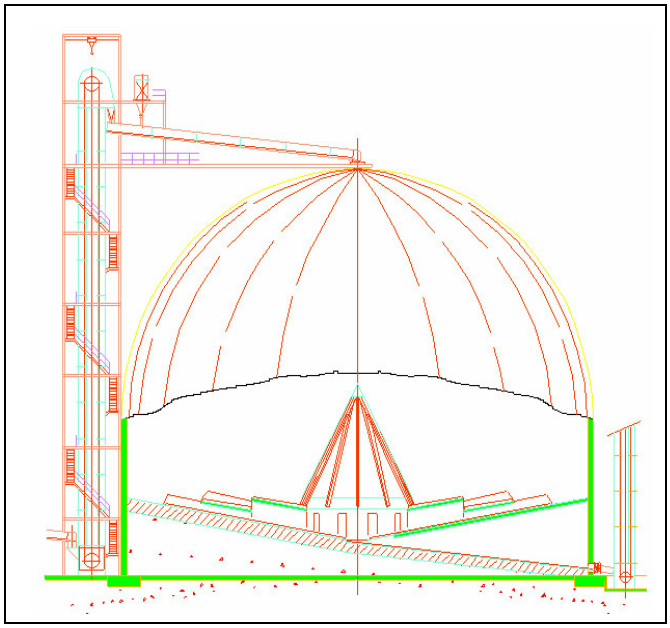
Concrete domes are simple yet effective. Besides requiring relatively simple foundations domes are also simple to fill and relatively simple to empty. In most instances a dome can be filled by conveying material to a single opening at the apex. The compactness of a concrete dome storage results in the filling conveyors being shorter and simpler than what would be needed to fill either a silo or a flat storage warehouse. The dome itself also serves as the support structure for large conveyor galleries. The primary advantages of concrete domes include:

- Superior protection of the stored materials
- Environmental and fugitive dust control
- Rapid construction regardless of weather
- Simple foundation requirements
- Low investment
- Low maintenance

| **Project Statistical Summary** | **Glens Falls Lehigh Cement Terminal<br>Providence, RI USA** |
|---|---|
| **Ship unloading** | Barge mounted Fuller Kovako pneumatic ship unloader |
| **Conveying dock to dome** | Pneumatic conveying; two 12 inch lines, 200 to 400 mtph |
| **Dome storage capacity** | 44,000 m. tones |
| **Dome size** | 42.4 m diameter by 34.1 m high |
| **Foundation (for dome)** | Spread footings (no pilings) |
| **Method of reclaim from dome** | Ibau multilevel fluidized floor system |
| **Reclaim capacity** | 200 to 400 mtph |
| **Conveying from dome to load out** | Bucket elevator feeding two air slides to load out bins |
| **Load out facilities** | Two 300 m. tonne capacity load out bins; one for trucks and the other for trucks or rail cars. |

## Reclaim system

Cement is withdrawn from the Providence dome at a rate of up to 400 mtph by means of an L/M/H discharge system designed and supplied by Ibau Hamburg. Ibau has over 25 years experience with pneumatic discharge systems for various types of storage and self unloading ships. Common to all their systems is the *first in first out* capability. The system they designed for the Providence dome is also capable of withdrawing up to 97% of the dome's total storage volume.



The system consists of three aeration rings, multiple levels of sloped ring sections, and a 10 m diameter steel pressure relief chamber. The floor is sloped at $10^0$ for the fluidslides and aeration panels. The two outer aeration rings each have 20 individual aeration sectors and 10 discharge tunnels. The inner aeration ring has 12 aeration sections. In all, fluidslides cover more than 90% of the floor area.

Cement within the silo is guided into the pressure relief chamber from the sections of the outer rings via small discharge tunnels which pass beneath the inner floor ring area. From the inner aeration ring cement flows directly into the relief chamber via radial fluidslides. This design specifically provides for the fluidslides to be relatively short in length for greater reliability. Fluidslides inside the pressure relief chamber are sloped towards a central discharge. Two Ibau flow control gates control the 400 mtph discharge rate.

Pneumatic equipment has few moving parts, keeping maintenance costs low. Blower equipment is also minimized by the design for cycling through the various rings and sectors. The energy to operate the system is only about 0.16 kWh per tonne of discharge.

## Summary

Glens Falls Lehigh Cement's new Providence, Rhode Island terminal has been operating since the spring of 2002. The heart of the terminal is a 44,000 mt capacity *DOMTEC*® dome equipped

with an innovative Ibau Hamburg reclaim system. The new terminal has put Glens Falls Lehigh Cement in a great position to serve its clients in Rhode Island as well as parts of Connecticut and Massachusetts.

References:

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Mike Hunter, 'Two New Terminals, The East Coast of America', INTERCEM Americas North Miami, Florida, 29 January 2002

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