

# Berth 503, Port of Portland – Top Deck, Beams and Girders



## Owner

Port of Portland

## Client

Moffat & Nichol

## Location

Portland, Oregon

## Project Components

- Precast panels and cast in place elements
- Condition assessment
- Durability analysis
- Service life predictions
- Remediation methods
- Life-cycle cost analysis

## Services Provided

- Civil Engineering
- Laboratory Testing
- Service Life Modeling

## Completion Date

2006

## Client Contact

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*Port of Portland, Berth 503*

Berth 503 is in service since 1997 and has been used for potash handling. It is thus subjected to year-round chloride exposure, which can have a dramatic effect on the service life of the structure. The port authority wanted to extend the service life of Berth 503 to 30 years in the future. **The mandate** given to Materials Service Life, LLC was to perform a condition assessment, to evaluate the actual state of degradation and contamination of the structure, as well as numerical simulations of residual service life for different repair options.

## MANDATE

- Investigate visually the actual state of degradation of the concrete deck, beams, girders and piles.
- Determine the chloride contamination level for the different elements and areas of the structure.
- Evaluate service life expectancy of the different components.
- Evaluate the performance of some repair options with respect to service life extension

## MSL SOLUTION

- Numerical simulations using STADIUM® allowed MSL to evaluate the service life expectation based on the chloride exposure conditions and on concrete transport properties.
- Recommendations had to consider extreme chloride exposure conditions.
- Using STADIUM®, service life expectations were compared for remediation methods that could be simulated and were proposed by MSL and the client.
- The cost-performance relationship of simulated repair options were evaluated by the client more easily.