

# **Pre-Fabricated Multi-Apron Steel Ramp**

**Designed & Developed By:**



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## Multi-Apron Ramp Facilities for Efficient & Economical Loading & Unloading of Vessels in Tidal Waters.



- **pre-fabricated**
- **ready for installation**

VJA has recently developed a new multi-apron ramp structure, designed for smooth transition of cars and trucks from land to ship or barge at all tidal conditions. This multi-apron system can significantly improve loading and unloading operations without requiring long and expensive ramp structures.

The new ramp system is fully controlled by an automatic hydraulic lifting system. This arrangement eliminates the need for high tower structures with overhead beams and counterweights and provides a safe, low maintenance and aesthetically pleasing structure.

The multi-apron concept was developed initially for, and in cooperation with, British Columbia Ferry Corporation, to upgrade and extend the operating range of their existing facilities without having to replace expensive berthing structures.



## Design Aspects

VJA has compiled a number of software packages for the design of ramps. These include structural analysis, member strength, environmental loadings and foundation capacity applications. Drawings are produced on AutoCad. Utilizing VJA's in-house library, new ramp designs can be prepared quickly and economically.

## Operational Aspects

For primary ramp movement and support under load, VJA has developed a heavy-duty hydraulic system which provides continuous self-adjusting automatic geometrical control and operation throughout a loading sequence. This feature ensures fast uninterrupted traffic movement.

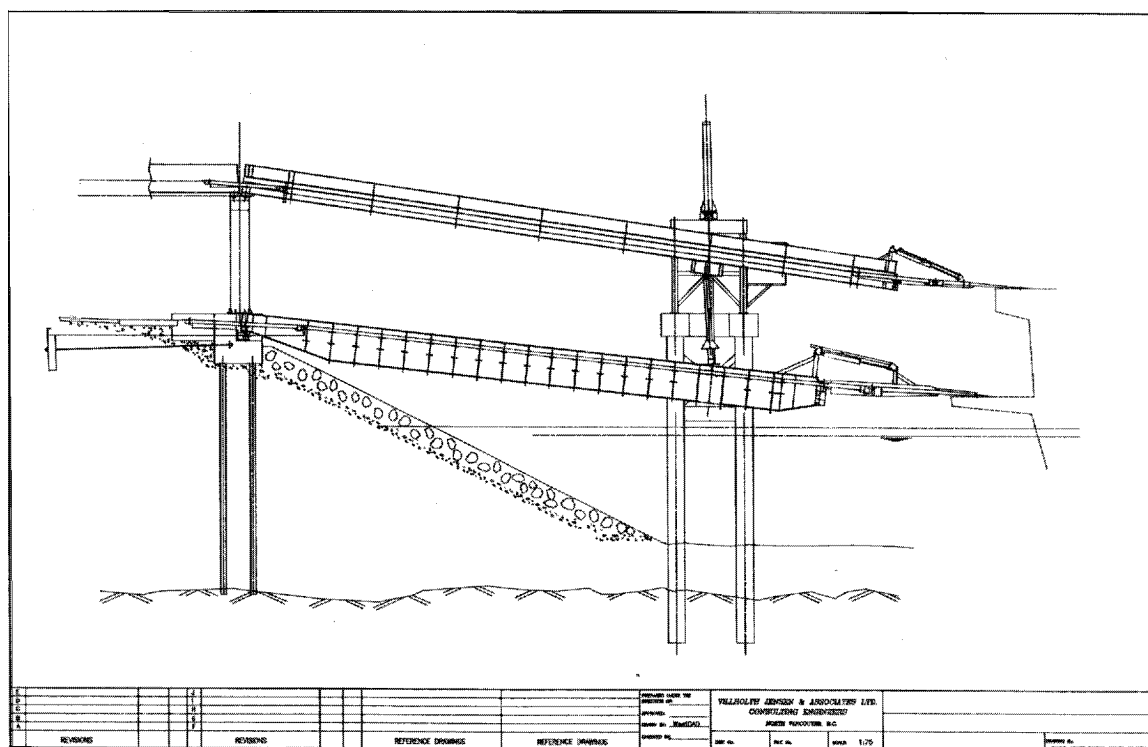
## Maintenance

In a marine environment, maintenance of structures is a major factor. VJA acknowledges this and carefully design their ramps so as to minimize the extent of required maintenance.

## New Double-Deck Ferry Ramp - Configuration

Lower and upper ramps are supported on a hydraulically activated primary lifting beam.

Ramp grade and apron angle is adjusted automatically as required during loading and unloading operations.

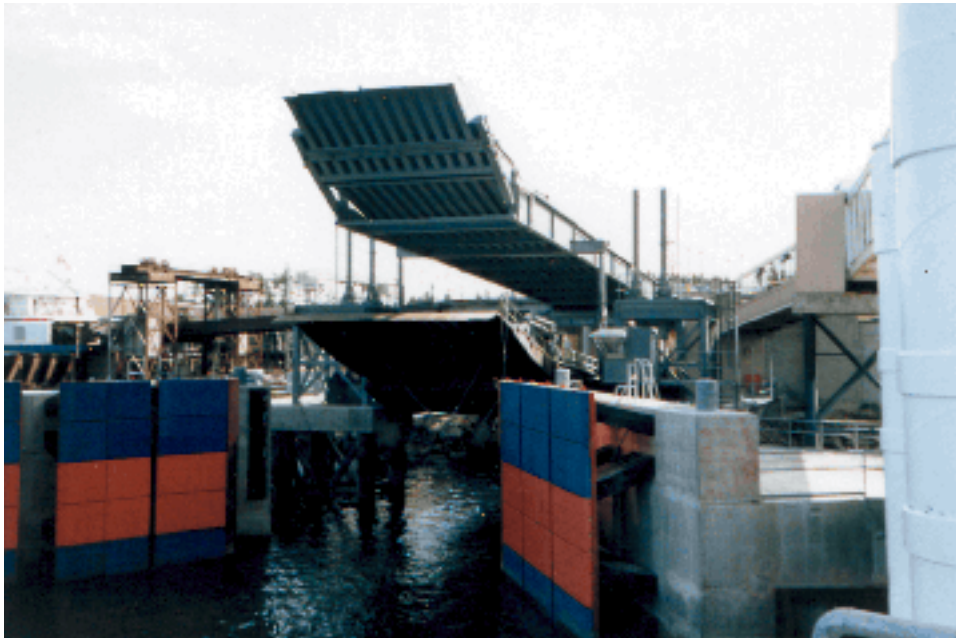


**New Double-Deck Ferry Ramp**



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## Pre-Fabricated Ramp Structure Installed at BC Ferry Corporation's Swartz Bay Facility

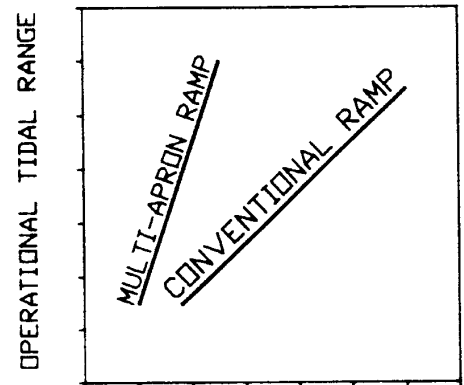




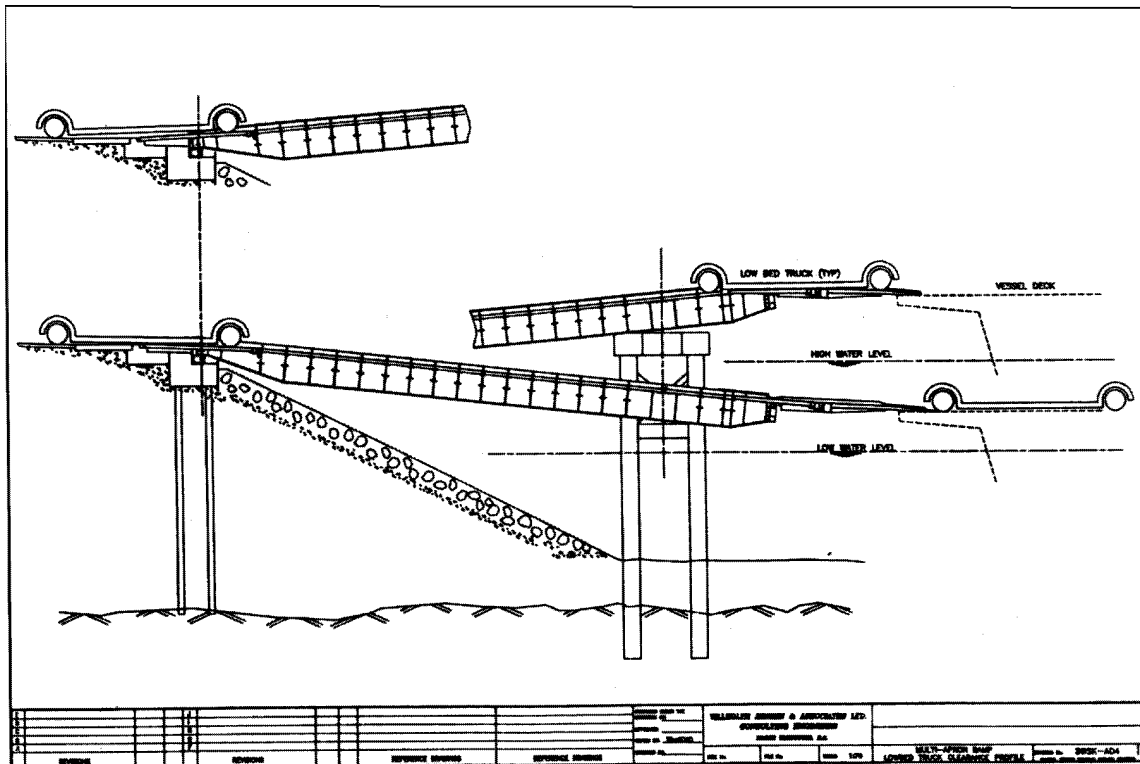
## Operational Range

The geometry and arrangement of most ramps on the West Coast results in some difficulties for efficient operation during large tides. This is due to the fact that transition from land to barge or ship is too abrupt at high and low tides for most standard ramp structures.

A structural ramp will have to be fairly long to ensure smooth transition for all transition ranges. The required length for a multi-apron ramp will, in some cases, be only 65% of the ramp length of the conventional ramp for the same undercarriage clearance.



MINIMUM RAMP LENGTH FOR LOW-BED TRUCK CLEARANCE



## Multi-Apron Ramp Operation for Low-Bed Trucks at Extreme Tidal Range



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## New Multi-Apron Steel Ramp Installed at BC Ferry Corporation's Existing Facility at Horseshoe Bay



### Applications

VJA designed ramps are suited for diverse applications and can be readily customized for incorporation into ferry terminals, rail car barge transfer terminals, forest product barge loading facilities and similar waterfront industries.

### Ramp Types

- Smooth transition, multi-apron ramps to accommodate a wide range of vehicles throughout large tidal ranges.
- Single and double-deck vehicular ramps to service ro-ro ferries and container traffic.
- Floating ramps for deep water locations.

### Safety

Complete safety in all aspects of structural form and operation is the paramount criterion on which VJA designed ramps are based.

### Economy

As a consequence of VJA's unique multi-apron design, ramps can be made shorter and lighter than conventional ramps.. Installation of pre-fabricated units into existing facilities can be readily and speedily achieved with minimal disruption to existing structures and operations. For the owner who has a facility that needs updating and throughput increased, and who cannot accept a lengthy downtime, VJA ramps are the economical answer.

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### Partial List of Clients:

VJA has provided ramp related services to the following clients:

- BC Ferry Corporation
- Fletcher Challenge Canada Ltd.
- Howe Sound Pulp & Paper
- MacMillan Bloedel Ltd.
- Miller Contracting
- Nanaimo Harbour Commission
- Prince Rupert Port Corporation