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# Repairs to Timber Cribway and Construction of Armour Stone Breakwater and Wharf in Belleoram, Newfoundland

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# **ABSTRACT**

The town of Belleoram, NL is comprised of approximately 450 residents located on the Connaigre Peninsula within Fortune Bay. Being a fishing town, the harbour has always been a typically sheltered area, protected from the wind and the waves that are known to the southern coast of the island. Throughout recent years, with the impact of hurricanes and tropical storms being felt on the province as a whole, the town has experienced higher waves than usual that have been providing quite a problem to certain parts of the town. One of which being an area of timber spillway that is located on the Northeast side of the town. This spillway has served as adequate protection to the finger of beach comprised of wharves and slipways used to safely house the fishing boats within the town until recent storms.

With these higher waves becoming more common in the area, flooding of the area has been happening more often due to the spillway not being capable of handling such weather. Roadways on the beach have been washed away and debris such as large rocks and stones have been deposited on the wharves causing numerous problems and damages for the fishermen of the town. In order to combat such waves, in 2010, council had approved the construction of a breakwater to line the full length of the beach to help break up oncoming waves and prevent them from rolling onto the land and causing more damage. The breakwater was comprised of having rock core fill, filter stone and armour stone along the seaward side of the harbour.

Along with the timber cribway repair and breakwater construction, the Government of Newfoundland & Labrador had also approved funding of a new large wharf in the town which will be used to provide more mooring room and protection for local fishing boats and the larger aquacutlture boats which are now present within the community.

The following paper will highlight the advantages that have occurred since construction the break water and the wharf, and its effects that it has had on the community of fishermen as a whole.

# 1 INTRODUCTION

Belleoram is a fishing community located on the Connaigre Peninsula, within Fortune Bay, on the south coast of the island of Newfoundland on route 363. With a population of approximately 450 individuals, the tiny town is approximately 600 km from the capital city of St. John's, and 200 km from the Trans Canada Highway. The following map will offer better insight to its location in respect to the island.

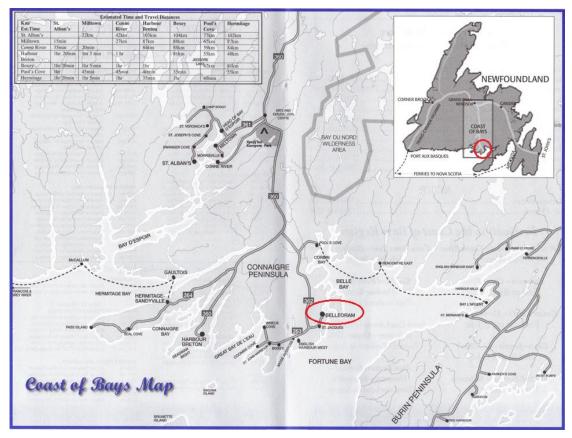


Figure 1: Location of Belleoram, NL

For the majority of its history, Belleoram's major industry was that of the traditional inshore fishery with fishermen using open boats and small long liners to catch their product and return to the harbour each evening to prepare for the following day. The main species which have been caught within the area are codfish; which is typical of outport Newfoundland lobster, crab, herring and other "non-conventional" species such as turbot and flounder. The town of Belleoram was first settled in because of its massive harbour which has been protected throughout the years by a large beach that is located on the eastern side of the town and a hilly terrain which surrounds all other sides of the town, basically making it be located at the bottom of a valley. These geographical aspects of the town ahs provided much shelter from the harsh Newfoundland weather, mainly the wind, which could cause many problems to the fishermen of the area had it not been there.

In recent years, the economy in the area has taken quite a change with a shift being from the traditional inshore fishery to that of the aquaculture industry. Many residents in the town and the surrounding area are now employed by Cooke Aquaculture and they area based out of Belleoram. With this influx of new industry, the beach and surrounding area has seen a great deal of infrastructure

improvements due to the new cash flow in the town and the fact that many large trucks and other vehicles now need to use the area which means larger loads on the roads, wharves and other marine infrastructure. In recent years, the Belleoram has received new paved roads going throughout portions of the town, a new large wharf which extends into the harbour for more mooring room for the larger ships that occupy the area, a floating dock and slipway, and also repairs have been down to the timber cribway breakwater that extends the length of the beach which houses all of the aquaculture equipment, fishing boats, merchant buildings and a recently shutdown scallop hatchery. This report will focus on the repairs and construction of an armour stone breakwater along the cribway and will also talk about the construction of the new wharf within the town.

A photo of Belleoram harbour can be seen below which highlights many of the aspects described above.



Figure 2: Belleoram Harbour

# 2 WHARF EXTENSION AND CONSTRUCTION

In 2009, the Government of Newfoundland and Labrador invested \$1.9 million in the construction of a new finger pier wharf in Belleoram for bio-security reasons revolving around the aquaculture industry in the area which had already grown to be huge at this point. Along with the construction of a new wharf, an extension was also to be built on an existing finger pier wharf that was already present in the area. This new wharf, and the extension, was to be used to shelter many vessels which docked in the harbour whether that being fishing vessels, or the larger aquaculture vessels and barges.



Figure 3: Preliminary Areas for Wharves

As per the tender documents, the successful bidder first had to dredge the area of the new wharf location in order to place a rock mattress to provide a suitable foundation for the wharf which would then support the treated timber cribway of the structure. From this cribway, piles were to be driven down below the surface and ultimately capped with a reinforced concrete deck capable of withstanding the tractor trailer loads that were to be placed upon it. The wharf was to be approximately 50 metres in length and with a width of 9.1 metres and was to be placed adjacent to the on-site fish plant and scallop hatchery that were already in the area.

Construction began and finished on the wharves in 2010 and has been perfectly operable thus far and should be for future years in the aquaculture industry.



Figure 4: Construction of the Wharves Nearing Completion

# 3 RUBBLE MOUND BREAKWATER

Following the government funding for the above mentioned finger pier wharves, the next project for the town of Belleoram to improve their coastal infrastructure was to repair the timber cribway which ran the length of the entire beach which was used to provide some protection from the waves and to also provide protection for commuters travelling the area not to drive into the waters by way of accident. In 2010, a tender was placed for repairs of the in place timber cribway and to also construct a rubble mound breakwater along the area to prevent waves from crashing onto the road. With the aquaculture industry becoming big in the recent years in the area, there was quite a bit of equipment and machinery that was stored on the beach and was prone to being exposed to the salty water, leading to corrosion, and big waves which lead to road washouts and major erosion of the non-paved roadway. Many times in previous years, the town has experienced large rocks being displaced on the roadway by the large waves that were prong to coming in over the area, and now with the increased traffic that was in the area, something had to be done to improve the safety of the roadway, equipment and the people itself.



Figure 5: Belleoram Beach before Construction

Tender for the project was awarded on July  $26^{th}$ , 2010 to Seagull Construction from Topsail, NL. The rubble mound breakwater was to be constructed in approximately 3-4 metres of water along the coast and would have to extend down to the seafloor. The breakwater consisted of a rock fill core, filter stone and armour stone protection along the seaward side of the harbour. The armour stone on the seaward side of the harbour provides adequate relief of the sea waves that pound this side of Belleoram harbour and gives more shelter to the vessels and machinery that is at this location.



Figure 6: Placing of Armour Stone along the Beach

## 4 CONCLUSION

The town of Belleoram has received some major upgrades in the form of infrastructure in the past number of years. Since the aquaculture industry has moved into the area, it has seen two new wharves in the town, a new slipway and floating dock and a protected armour stone breakwater. This has provided much help to the community in whole in protecting its roadway that leads along the beach in the town, as well as the fishermen who store there vessels on the slipways and docks during the year. The new wharf has provided quite a bit of space for fishermen and the aquaculture industry to store their boats when not in use, and the breakwater has provided a great deal of protection to the boats and infrastructure, and a lot of comfort for the residents of the area. If the aquaculture industry is going stay in the area, then a lot more infrastructure and income in sure to follow.

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