

Mech 45X Proposal 2020

Sponsor: UBC Aquatic Centre

Liaison: Andy Miller. andy.miller@ubc.ca

Manager Maintenance, Safety and Sustainability | UBC Aquatic Centre | Department of Athletics and Recreation

Title

Hot Tub Insulation Analysis and Design

Introduction

The UBC Aquatic Centre was opened in 2017. The facility has LEED Gold status and serves the UBC and local communities. As a building this project has won wide acclaim in the architectural world: <https://www.archdaily.com/891829/ubc-aquatic-centre-mjma-plus-acton-ostry-architects>.

The facility spent about a quarter of a million dollars on heat energy in fiscal 2019. Savings by better utilizing the heat in the building will improve the operating costs.

The Hot Tub is the warmest basin in the facility running at a set point of 104 F. Historically the Hot Tub is only just able to reach 104 F, often running at 102-103 F. Heat is lost through evaporation from the water's surface and about 100 m of piping in the basement. Heat energy will also be lost from approximately 200 m of piping from the Leisure pool.

During the recent COVID closure of the Aquatic Centre there was a dramatic reduction in the temperature of the mechanical rooms in the basement suggesting significant heat gain from the pipe runs.

Brief Project Description

Calculate the heat lost from the water surface of the hot tub and from the hot tub piping and from the piping of the Leisure pool. Identify any other areas of heat loss. Research and evaluate methods to reduce heat loss. Develop proposals to reduce the heat losses through surface covers, insulation of pipes or other means.



Expected Outcomes

Provide detailed proposals as above with impact to heat required, installation and operation costs, expected life/replacement frequency and payback for each.

Resources available

The team is expected to be largely independent. UBC Aquatic Centre is located on the campus of UBC and can be made available for site visits if arranged in advance. I can make the site available for contractor visits and provide some guidance in working with contractors.

Some simple short run experimentation may be possible utilizing existing data capture hardware and short observational periods. Long experiments will not be possible due to potential impacts on Hot Tub availability.

Requirements

The piping is in the basement and is not constrained by any architectural or esthetic standards.

Pool recirculation flow and pipe design for pools is tightly regulated so flow rates and current piping design is not flexible. Likewise the equipment layout is not easily changed within the current footprint. This will be a retrofit project.