Hollywood Ice Engineering – Designing and delivering a stage to film on

Louise Lake, Yukon

Submission for 2017 Engineers Yukon Engineering Excellence Award

Submitted by: Tetra Tech

Project Team

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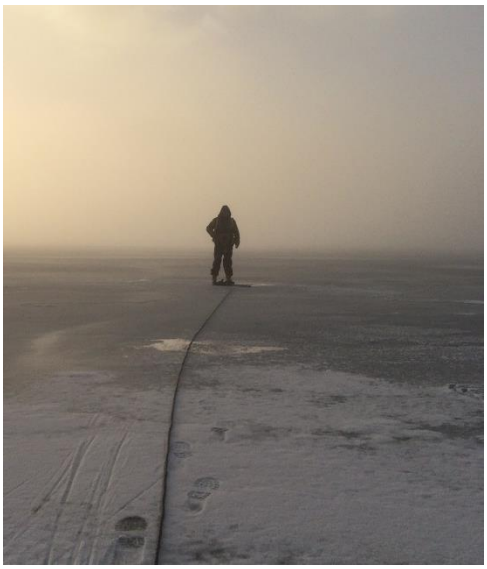
TETRA TECH

Introduction

Yukon's rugged mountains and vast landscapes have long attracted global attention – from the pioneers of a hundred years ago who battled their way over the pass to find gold, to the adventure tourists of today who come to experience Canada's north. The pristine wilderness in our backyard instills a sense of awe that directors often try to capture and convey to southern audiences through their films. Tetra Tech provided ice engineering services for one such company looking to film sports cars performing precision maneuvers at high speeds for a television commercial.

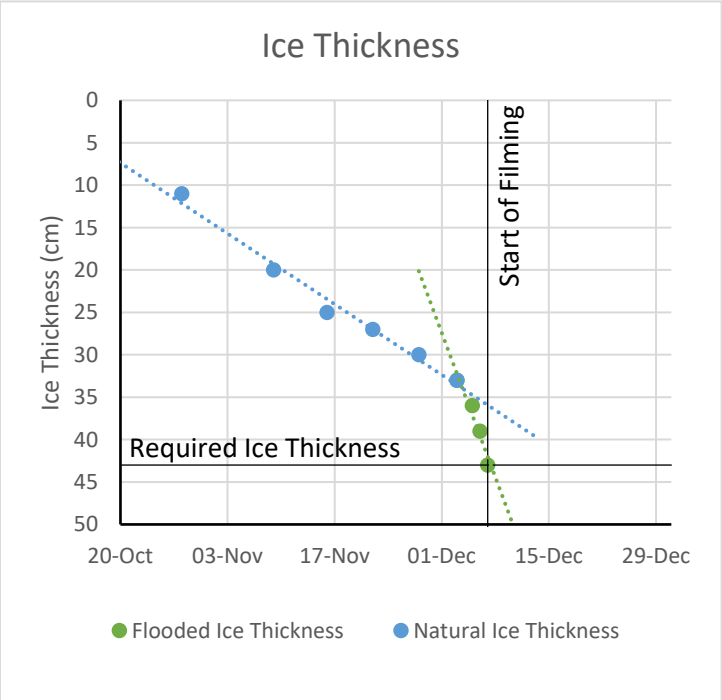
Project Description



The storyboard for our client's commercial featured high end sports cars roaring around a frozen lake with snowy, untouched mountains in the background. Yukon is no stranger to such shoots, but the challenging aspect of this project was the timing. Typically filming on ice occurs in March when the days are longer and the ice is thick. To time the release of this commercial with a Hollywood film that hits theatres in April 2017, filming needed to happen in early December. Tetra Tech was retained to investigate, monitor, and engineer an ice cover to support the planned activities.

In October, as ice formed on the lakes around Whitehorse, Tetra Tech visited three potential shooting locations weekly to monitor natural ice growth. We tracked ice accumulation and projected anticipated ice thickness using historic climate data and long term forecasts. During each survey ice consistency and quality was also assessed as both affect the carrying capacity of ice. All of this was achieved through systematically coring holes in the ice at regular intervals across the proposed project footing.

In November, a location was selected and the engineering calculations began to determine the strength of the natural ice and required thickness for safely conducting the proposed activities. Relying on Canadian codes of practice for safety on ice, publications on the structural properties of ice covers, our engineering experience with similar studies, and detailed descriptions of the proposed on-ice activities, Tetra Tech was able to analyze the dynamic forces associated with multiple vehicles travelling in close proximity at high speeds and recommend a minimum ice thickness to safely support filming activities.



By the end of November it was evident that the recommended 43 cm of clear strong ice was not going to form naturally and that Mother Nature needed help. Tetra Tech assisted with the direction of clearing and flooding efforts for the project area measuring nearly 30 acres (600 x 200 m).

In the final week before filming, 10 cm of ice was added through flooding to achieve the required thickness. Tetra Tech personnel drilled over a hundred holes through the ice in a grid pattern across the project footprint immediately prior to filming to verify ice consistency and quality. Tetra Tech developed a comprehensive safety plan to manage risk which included briefings for all personnel conducting work on the ice, strict rules for maximum speed and vehicle spacing, the requirement for a dedicated ice rescue team, and full time engineering oversight during filming activities.

Through detailed engineering assessment, analysis, and risk management, Tetra Tech was able to confidently allow early season filming on ice while ensuring the safety of everyone involved. Our client was able to obtain the footage they wanted on the timeline they needed. Yukon locations will be showcased on the big screen this spring, further establishing local tourism and film industries.

Innovation/Adaptation

This project featured the application of ice engineering investigation and design in determining safe parameters for an aggressive early season project timeline. Tetra Tech was able to achieve a safe stage for the filming activities by calculating the precise structural requirements for the ice cover based on the dynamic loads of the proposed activities, and accelerating ice formation with snow clearing and flooding efforts. Tetra Tech adapted ice road construction and risk management techniques to prepare the ice cover; without additional flooding the project would not have been able to proceed safely in early December.

Sustainability

In an age when even the most environmentally conscious projects leave a lasting impression on the landscape Tetra Tech was pleased to be involved in a project where all evidence of our activities melts away when spring arrives. Ice provides a truly sustainable medium for filming – no new clearing of land or traditional construction materials were consumed in preparing the site for this project.

Community

When the film industry descends on Yukon there is a considerable amount invested in the community. Transportation (airfare and vehicle rentals), hospitality (hotels and restaurants), and local small businesses (equipment and labour) benefit. In the final stages of preparing the ice cover, over a dozen independent snow clearing contractors assisted in the clearing and flooding efforts. Film projects provide employment for community members across industries from engineers to hoteliers.

Enhancement

This project enhanced Yukon's reputation in the ice engineering, film, and tourism industries.

Engineering the safe execution of an early season project for the film industry enhances Yukon's reputation for having not only beautiful landscapes but the engineering expertise required to meet complex project objectives. With each successful project, Yukon gains recognition as a viable filming location in this international market.

The ice engineering Tetra Tech undertook made it possible to showcase Yukon to industry members that came for the filming and the world audience that will see our rugged landscape when the television commercial airs.