Project Name:	WD Borger - Pressure activated removable plugs for large box culverts.	**Start Date:**	2022-06-01
Project Number:	2217	**Completion Date:**	2022-12-30

Project Details:

Scientific or Technological Objectives:

2] The appellant claimed two SRED projects that year, one entitled “Improved sealing between submerged, rough cast surfaces” and the other entitled “Pressure activated removable plugs for large box culverts.”

The Minister of National Revenue says that the activities relating to the second project did not meet the definition of SRED and therefore, disallowed the related SRED expenditures.

4] The appellant is part of the Borger Group of Companies, established in 1919. The appellant’s general manager Ahmed Kalaf testified that it specializes in deep utility servicing, earthmoving and more recently, transportation.

15] Mr. Kalaf testified that he has a Bachelor of Science degree earned in 2007 and acknowledged that he is not a civil engineer

Field of Science/Technology:

Civil Engineering (2.01.01)

Project Details:

Intended Results:	Improve existing materials, devices, or products
Work locations:	Commercial Facility
Key Employees:	Ahmed Kalaf (WD Borger) (? - BSc. (2007) / GM)
Evidence types:	Test protocols, test data, analysis of test results, conclusions; Records of resources allocated to the project, time sheets; Records of trial runs

Scientific or Technological Advancement:

Uncertainty #1: Technological uncertainty

6] Mr. Kalaf testified that culverts are generally installed above water level so in this instance, it was a particular challenge that the invert (i.e. the bottom of the interior) of the box culvert was approximately 4 metres below the pond’s surface. He explained that the pond water would exert a head pressure (i.e. pressure caused by its weight) on any blocking device they might use.

Therefore, the blocking device would have to be able to withstand 4 metres (i.e. 13 feet) of head pressure. He also stated that draining the pond was not an option in this instance because they were not permitted to disturb its vegetation.

He added that the base of the pond was also uneven because there was a layer of riprap, which is a rock product used to protect the pond’s inlets and outlets from erosion.

7] Another physical consideration was hoop stress, which Mr. Kalaf explained to be the stress exerted on a cylindrical device (i.e. in this case, the culvert itself and the inflatable bladder dam discussed below). For the purposes of this appeal, it is relevant that hoop stress is affected by the amount of pressure on the cylinder, the width of the cylinder, and the thickness of the cylinder wall; for example, thickening the cylinder wall lowers the hoop stress.

INDUSTRY STANDARDS:

8] Mr. Kalaf stated that the appellant made inquiries within their industry as to how/whether others had encountered this situation, as well as conducted internet research.

He testified that both lines of inquiry yielded minimal information, and that the appellant ultimately tried both a water-filled inflatable bladder dam (also known as an inflatable or portable cofferdam) as well as a rigid cap as blockage devices.

The most significant underlying key variables are:

water head pressure (unresolved), hoop stress (unresolved)

Technology or Knowledge Base Level:

Activity #1-1: Activity 1 (Fiscal Year 2022)

Methods of experimentation:

20] The appellant tried existing dewatering procedures in terms of the inflatable bladder dam and a rigid cap. The appellant ultimately used the concrete cap, inserted physical objects to block any remaining gaps, and controlled ongoing seepage by using pumps.

Results:

Conclusion:

Judges comments & ruling:

21] I would consider the use of physical objects and pumps in this manner to be within the scope of their standard usages.

22] As an example of trial and error, the appellant purchased the 8-foot x 50-foot inflatable bladder dam whose manufacturer's specifications indicated that it could control 6 feet of still water. The culvert itself was 2.4 metres x 2.4 metres (i.e. 7.8 feet x 7.8 feet) with 4 metres (i.e. 13 feet) of head pressure exerted by the pond water.

Even though the culvert's interior surface was not smooth, the appellant informed the seller that there were no objects present which could potentially damage the dam's interface.

Given these parameters and contraindications, it seems that success was very unlikely from the outset. The effort also did not reach the level of disproving a scientific hypothesis because the bladder dam was used for its created purpose (i.e. blocking water) and the variables exceeded the capabilities already set out by its manufacturer.

24] there was no advancement in the field of civil engineering for the purposes of the SRED provisions

25] The appeal is dismissed, without costs.

Documentation:

- Offline Documents: docs

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