



SR&ED cases – TECHNOLOGY

Beton Mobile – losing projects

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8 UNSUCCESSFUL projects

Project	Employee Wages	Subcontractor Costs	Material Costs	Total
Number / Name				
B-10-03: Determination of moisture in latex concrete.	\$ 944		\$ 446	\$ 1,390
B-10-05: Development of a self-consolidating concrete Ter C3.	\$ 7,705	\$ 7,500	\$ 1,569	\$ 16,774
B-10-07: Characterization of Ter-C3 cement.	\$ 11,039	\$ 3,844	\$ 1,423	\$ 16,306
B-10-08: Development of a type V concrete with Ter-C3 cement	\$ 1,417	\$ 755	\$ 101	\$ 2,273
B-10-09: Characterization of a new generation plasticizer.	\$ 3,002	\$ 1,115	\$ 494	\$ 4,611
B-10-12: Development of cavernous concrete with a high vacuum content.	\$ 18,306	\$ -	\$ -	\$ 18,306
B-11-01: Study of permeability to chloride ions and durability with various pozzolanic additions and	\$ 30,931	\$ 26,270	\$ 3,432	\$ 60,633
B-12-02: Improvement of quick setting self-compacting concrete.	\$ 28,015	\$ 1,921	\$ 1,270	\$ 31,206
	\$ 101,359	\$ 41,405	\$ 8,735	\$ 151,499

Calculations based on judge's ruling of what expenses would have qualified had project been successful

Background

***Disclaimer* Limitations on evaluating case**

- No knowledge on interactions between BMQ and CRA prior to trial.
- Took ~9 years for projects for resolution
- Judge has ruled on 2 SR&ED cases recently
 - One loss (Concept Danat)
 - One partial win / partial loss (Beton Mobile)

Witnesses

- CRA – 2 RTA's testified
 - Mr. Cédric Durban
 - PhD mechanical engineering
 - Former SR&ED consultant – joined CRA in 2009
 - Mr. Karim Mimoune
 - PhD mechanical engineering
 - Began working for CRA in 2002
- BMQ – 2 witness from company
 - Mr. Jacques Bertrand
 - Engineer, a founder of BMQ
 - Mr. Gérard Dubé
 - Engineer at BMQ

Framework

- Heavily reliant on Northwest Hydraulics (5 Qs)
- References IC86-4R3 (in use up to 2014)
- Carefully outlines key concepts, incl:
 - Technological or Scientific Uncertainty
 - Hypothesis
 - Scientific Method
 - Documentation (Formal Report)

B-11-01: Study of permeability to chloride ions & durability with various pozzolanic additions & cements

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Background:

- [233] In 2009-2010, MTQ & CSA added new requirement standards concrete, namely a permeability threshold for chlorine ions. ...
 - In order to meet concrete standards, twenty-two tests must be performed, to which is now added the new test for permeability to chlorine ions.
- [234] A grace period of a few months was granted to the companies to give them time to do the tests necessary to demonstrate that their concrete mixes complied with the new standard.

Key Criteria Summary

2021 - B-11-01: Study of permeability to chloride ions and durability with various pozzolanic additions and	
BENCHMARKS	ACTIVITIES BY YEAR
Internet searches: 1 Articles	2020
	1-1
	Activity 1
OBJECTIVES	RESULTS
chlorine penetration: 2500 coulombs compression resistance: x spalling: x freeze thaw stability: x air bubble distribution: x	2800
UNCERTAINTIES & KEY VARIABLES	CONCLUSIONS
1 - Technological uncertainty	
adding pozzolan	
effects of latex	
modify mixing method	
	METHODS
Analysis Trials Prototypes Lines of code	15

Experimentation

JUDGE'S SUMMARY OF EXPERIMENTATION

- [244] BMQ made an inventory of its products,
 - checked which ones met the standards,
 - changed the mixing sequence and
 - how to introduce the adjuvants,
 - balanced the content of cement and
 - minerals like pozzolan
 - in order to reformulate products and,
 - after receiving the results of laboratory tests ,
 - selected the mixtures which complied with the standards.

[HOWEVER]

- BMQ did not investigate the reasons *why* some of these mixtures did not meet the standards.

Taxpayer Position

- [242] According to the Appellant,
 - data was missing and that it was collected by it, following the modification of the standards, within the framework of this project.
 - The information then allowed BMQ to reformulate its mixtures and improve them as regards permeability to chlorine ions.

CRA Position

- [243] According to Mr. Mimoune (RTA),
 - existing mixtures containing known ingredients were tested.
 - techniques used to adapt mixes also standard engineering techniques.
 - The scientific method not respected since no links between mixtures tested;
 - do not fit into a logical sequence
 - simply abandoned some when standard not met,
 - instead of trying to understand causes of failure.

Ruling & Rationale

According to the judge;

- [247] I note mixtures tested directly, without having been reformulated in any way.
- [248] BMQ also carried out tests to verify the effect of pozzolan on cements as well as the effect of modifying the mixing method.
 - pozzolan ... effects on porosity well known and documented in the scientific literature for many years.
 - adding pozzolan and modifying mixing method are techniques known in the industry, however, use of mobile concrete mixer makes the results unpredictable.

Judge's Rationale For Ruling (Loss)

- [248] BMQ did not convince me use of mobile concrete mixer brings a degree of scientific uncertainty that would justify that the activities be qualified as SR&ED activities.
- [249] I do not see how the MTQ could have set up such a standard knowing that the companies could not meet it ... demonstrates absence of scientific or technological uncertainty.
- [250] not convince me that it followed the scientific method ... although tests by independent laboratory, trial and error noticeable ... the passage one mixture to another without ... analysis of reasons why meet standards or not.
- [252] activities ... cannot be qualified as SR&ED since normal product characterization tests that have not created scientific uncertainty.

Concrete Lessons

- Keep good documentation that shows thought process (including the analysis of *why* it worked/didn't work) [244] [250]
- Proof your timesheets: content may be reviewed [247] to see if it is “normal data collection”
- Have a good foundation - be firm on your technological uncertainty (ex. mobile mixer) [248] [249]

B-12-02 Improvement of quick setting self-compacting concrete

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Background:

- [333] ...make repairs to the Manouane C Dam. However, the inputs contained in the mixture segregated.
- [334] ... the test results remained satisfactory and did not match the problems encountered by its client.

Key Criteria Summary

2023 - B-12-02 Improvement of quick setting self-compacting concrete	
BENCHMARKS	ACTIVITIES BY YEAR
(none)	2020
	1-1
	Activity 1
OBJECTIVES	RESULTS
Cause of aggregate segregation: 1 yes = 1 or no = 0	
UNCERTAINTIES & KEY VARIABLES	CONCLUSIONS
1 - Technological uncertainty	
effects of colloidal agents	
effects of plasticizers	
setting agents	
WATER CONTENT & CONTAMINANTS	
	METHODS
Analysis	4
Trials	4

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Experimentation

JUDGE'S SUMMARY OF EXPERIMENTATION

[336] After analyzing various factors that could cause a mixture to segregate, such as the weather or the presence of vibrations

- **Local water use only variation** could find
- Any potable water should not have an impact on concrete unless organic matter is present
- Repeated tests with sample water on site
- Discovered water on site was problematic, even though it was potable
- **Unable to specify element** present which could have had this effect

[337] water was therefore delivered to the site to allow the work to be completed.

- From now on ... water to be used in the mixture be sent to it beforehand so that it can carry out tests.

Taxpayer Position

- [339] According to the appellant,
 - aim[ed] to determine the factors that may affect a mixture on the job site, which met standards when it was tested in laboratory.
 - New knowledge on the impact of water on concrete was acquired during this project.

CRA Position

- [340] According to Mr. Mimoune (RTA),
 - the mixture used was already known to BMQ, although adjustments regarding the dosage of the inputs were made.
 - The steps taken ... were aimed at solving a technical problem, which was done by the trial-and-error method since BMQ used public data and the experience of its staff and collaborators to solve the problem.
 - Problems encountered in the development of the mixture are normal difficulties whose solutions are part of current practice.

Judge's Rationale For Ruling (Loss)

[342] BMQ used current technological knowledge...

- There would have been **technological uncertainty** if BMQ had convinced me probability achieving objectives or way to achieve them could **not be known** or determined in advance based on the **experience or technological knowledge usually available...**
- addition of colloidal agent to decrease segregation of mixture, analysis of weather & vibrations are **common techniques in the industry.**

Judge's Rationale For Ruling (Loss)

- [344] ...**testimony is not consistent** with the content of the T661 form and what BMQ claims in the letter of November 12, 2013...the timesheets produced in evidence indicate that the water used in this project has been tested and found to comply...no mention of the tests carried out with different water that Mr. Dubé talked about.
- [345] ...the trial-and-error method ... not by applying the scientific method, even if several hypotheses were put forward by BMQ
- [346] Finally...the BMQ tests can be partially reconstructed using its documentation, but a report compiling the tests and making it possible to follow BMQ's thinking throughout the project has not been prepared....

Concrete Lessons

- Keep good documentation that shows thought process (including the analysis of *why* it worked/didn't work) [343]
- Trial testimony should NOT contradict T661 statements [344]
- Proof your timesheets: be wary of double entry [351] or estimates [353]
 - Some flexibility with specified employees.