Project Name:	11-07: Developing an ultra-fast setting mortar for installation in a marine environment	**Start Date:**	2020-03-04
Project Number:	2013	**Completion Date:**	2020-12-31

Project Details:

Scientific or Technological Objectives:

10.1 Description of the project
[286] This project started when BMQ received a request from a client for a cement mixture based on ultra-rapid cement to be used to seal rock underwater and used as a bridge pillar. A mortar mixture intended to be installed underwater has the characteristic of containing an anti-leaching additive so that it holds in place without diluting. The client demanded that the setting of the mortar be very rapid in order to be able to start work the day after the laying of the mortar, while a waiting period of 21 days after laying is normally necessary.

[287] The component of activities preceding September 8, 2010 is no longer the subject of a claim for deduction for expenses relating to SR&ED activities. The aim of these activities was to improve the air content of certain mixtures, without affecting the properties of the mixture. However, at the hearing, BMQ agreed that the claim for SR&ED expense deduction would only apply to activities that began on September 8, 2010 with the formulation of a new quick-setting anti-leaching mortar mixture, which ended on October 27, 2010.

[288] In order for the mortar to set quickly, BMQ had to add an accelerating adjuvant to its mixture. According to the timesheets produced in evidence, the superplasticizer adjuvant was also modified to improve the air content of the mixture. This formulation was tested at BMQ in order to check if the mortar could be poured using a mobile concrete mixer and would spread well in the cavities of the rock. Samples taken during this test showed that the addition of the superplasticizer adjuvant negatively affected the compressive strength of the mixture at an early age.

[289] Several reformulations took place following the test in order to optimize the air content as well as the resistance of the mixture to compression. BMQ succeeded in creating the desired mixture and the client was able to carry out their project with the mortar recipe created by BMQ.

[290] In the event that the activities carried out by BMQ in the context of this project are qualified as SR&ED activities, the parties' disagreement would only remain with regard to salary expenditures totaling $ 1,390, including the deduction is claimed by BMQ and subcontractor costs totaling $ 1,917. The respondent agrees that amounts of $ 1,920 for salaries and $ 394 for materials would be expenses deductible under section 37 and eligible for the calculation of the ITC.

Field of Science/Technology:

Project Details:

Intended Results:	Improve existing processes
Work locations:	Research Facility
Key Employees:	
Evidence types:	

Scientific or Technological Advancement:

Uncertainty #1: Technological uncertainty

[291] According to the appellant, the project enabled BMQ to create a new product, which did not previously exist. This product being non-existent, there was no data on this subject. In his analysis, Mr. Mimoune failed to consider the need to place the mortar underwater. These activities therefore consist of SR&ED activities since they constitute experimental development work undertaken in the interest of technological progress.

[292] According to the respondent, the activities cannot be classified as SR&ED since this project does not reveal any technological uncertainty. According to Mr. Mimoune, the work was carried out using basic knowledge in the field. Thus, if a setting accelerator is used (as for quick-setting mortars), it is clear that the air content of the mixture will be lower and that it will therefore be necessary to compensate with an adjuvant which promotes the creation of air bubbles . Also, large-scale tests were carried out the week following the development of the mixture, which demonstrates the absence of technological uncertainty.

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[295] However, the evidence also showed that BMQ knew that the addition of an accelerator would have a negative impact on the air content of a mixture. This is what emerges from the introduction to the project, which can be found on form T661: "The objectives of this project are to optimize and obtain robustness in the air content of concrete mixtures fast. The presence of setting accelerator in an air-entrained concrete formulation significantly influences the air content as well as the network of air bubbles. "Also, according to this form, in order to optimize certain mixtures, certain adjuvants had to be replaced by other adjuvants; this replacement of superplasticizing adjuvants by other superplasticizing adjuvants included certain factors of uncertainty which led to certain dosages having to be re-evaluated. Likewise, Mr. Bertrand indicated that BMQ had used quick-setting cement since 2001 and that it had been used in the United States since the 1990s.

[296] But although BMQ used current technological knowledge or current practices to create the new product in this project, BMQ could not predict whether the objectives could be achieved, or at least BMQ could be fairly convinced of achieving them. , but without knowing with certainty which solution would be applicable. The uncertainty concerned the creation of a product allowing installation underwater and containing an anti-leaching adjuvant so that the product held in place without diluting, and which would be taken very quickly. This project is not a product development since the evidence has shown that such a product does not exist, and it is not about data collection since only activities that started on September 8, 2010.

Technology or Knowledge Base Level:

Activity #1-1: Activity 1 (Fiscal Year 2020)

Methods of experimentation:

[293] In the case of this project, BMQ succeeded in demonstrating that, on the balance of probabilities, there was a technological uncertainty raised by the requests of its client.

[294] In the present case, the evidence demonstrated that this project resulted in the creation of a new product (907 mix), namely the quick-setting anti-leaching mortar; this product did not exist on the market before.

[297] Also, scientific progress in this case consists in advancing BMQ's knowledge of the various dosages and properties of the inputs used. In particular, BMQ learned that the new superplasticizer adjuvant affected the early compressive strength of its mixture and BMQ eliminated some dosing possibilities for the adjuvants tested to arrive at a solution.

[298] The fact that only one week has passed between the formulation of the mixture and the start of the tests does not in any way demonstrate the absence of technological uncertainty.

Results:

[300] As in the case of the other projects, BMQ's tests can partially be reconstructed using its documentation, but a report compiling the tests and making it possible to follow BMQ's thinking throughout the project did not been done. However, even if BMQ did not prepare a detailed account contemporaneously with the tests, the documentation produced at the hearing and the testimonial evidence, particularly the testimony of Mr. Bertrand, demonstrated the progress of the activities.

[306] The total expenses deductible under section 37 and eligible for the calculation of the ITC for salaries is therefore $ 2,979

Conclusion:

[299] BMQ demonstrated that, as part of this project, it had hypothesized that the air content of its mixture would be improved by modifying the superplasticizer adjuvant and that resistance at a young age would generally be improved by other modifications in the dosage of adjuvants. With regard to the use of the scientific method, I conclude that, since tests have been carried out scientifically and that the modifications made to adjust the dosages have been in reaction to the results obtained, the scientific method has been followed.

[300] As in the case of the other projects, BMQ's tests can partially be reconstructed using its documentation, but a report compiling the tests and making it possible to follow BMQ's thinking throughout the project did not been done. However, even if BMQ did not prepare a detailed account contemporaneously with the tests, the documentation produced at the hearing and the testimonial evidence, particularly the testimony of Mr. Bertrand, demonstrated the progress of the activities.

[301] Thus, for these reasons, the activities carried out by BMQ in the context of this project constitute SR&ED activities.