



EXAMPLE - BEGINNING AND END OF PROJECT

TechStyle Fabrics

1. Background – The Business Context¹

TechStyle Fabrics produces woven piece dyed² fabrics targeted at the apparel and upholstery markets. The company has been in velvet production for over 30 years in Canada.

In September 2003, the sales and development team decided that the market needed a corduroy-like velvet fabric, which would be railroaded³. The only similar products currently on the market were traditional flat woven weft loop corduroys targeted at the apparel market; these did not meet the performance requirements for upholstery. Part of the challenge was to find a way to produce the corduroy with piles at right angles to the usual direction; the simple solution of cutting the fabric at right angles to the current direction would not have worked, since this does not provide the width needed for upholstery applications.

2. Detailed Project Description⁴

PROJECT NAME: *Railroaded Corduroy for Upholstery market*

START DATE: September 2003

END DATE: March 2004

Section A: Scientific or Technological Objectives

The objective of the project was to develop a weaving process that leaves gaps in the weft direction in corduroy velvet fabrics. The result will be a new weave pattern that can be manufactured on the current equipment.

The resultant product is constrained by the need to have a soft and drapeable railroaded corduroy look and yet must meet the heavy-duty mechanical performance requirements for upholstery.

Section B: Technological or Knowledge Base Level

TechStyle Fabrics presently weaves corduroy with gaps in the warp direction and does not leave gaps in the weft direction. A process that provides a product with the gaps in the weft direction will add value for customers in the upholstery market by providing better yields during the cutting operations.

¹ *Note that the claimant is not required to provide a "background section" with the project description.* However, this material may be helpful in providing the project context.

² Piece dyeing is the dyeing of fabrics "in the piece" as opposed to dyeing the yarn or stock.

³ In a railroaded fabric, the pattern direction runs across the width (weft direction) rather than in the roll (warp) direction.

⁴ The claimant is required to provide a project description answering the questions in the T661, *Claim for Scientific Research and Experimental Development (SR&ED) in Canada* (www.cra-arc.gc.ca/E/pbg/tf/t661/README.html). This section should provide a set of answers that clearly explains why the claimant believes the work is eligible. In this example key details have been removed to protect proprietary information about how the improvements to weaving technology were achieved.

In order to accomplish this, the company had to find a new way to make the product. Traditional corduroy products are manufactured by weaving the fabric with loops that are aligned in the direction that the fabric is moving, so that they can be slit with stationary knives. This “slitting” method will not work for a product in which the loops are aligned across the machine; it is thus necessary to modify the slitters to perform the slitting while the material is moving. This change will impact the construction of the product.

A number of factors (the type of yarn used, its construction, its count, its density and how it is woven) all interact to determine the appearance and properties of the fabric. The changes in the manufacturing process that are required will result in a product that is very different in structure from other products produced by standard weaving. These modifications to the equipment and construction will change the product properties in ways that cannot be predicted without experiments.

The target product, like all corduroy products, must have clearly defined wales⁵; this results from erect piles. When the gaps are in the normal warp direction, blooming⁶ usually predominates in one direction. With any new structure there is no guarantee that the piles will be even, and the company expected this problem to be worse when the gaps are in the weft direction. The gaps might be extremely uneven or, in the worst case, not visible.

TechStyle Fabrics expected that a standard one ply polyester yarn, used together with current structures and latex backing, would not give the pile retention, softness (drapeability) and heavy duty performance at the manufacturing costs required for this railroad corduroy application.

They knew that they could achieve the heavy-duty construction performance needed by the upholstery industry using a latex backing. However, they expected that this backing would make the product too stiff, and if they could not eliminate it they would have to find ways to compensate for this.

Dyeing was expected to be routine, as the fibre is known to the dye-house. The dye formulations were taken from existing colours previously developed on this fibre. The colour development trials required to bring the fabric to market were not expected to require SR&ED.

They had to produce material with brushed and non-brushed finishes. This also was not expected to present any technological challenges.

If they were successful, they expected to further modify the new corduroy manufacturing process by altering the construction of the fabric to produce other three-dimensional fabrics, thus creating a new product line.

⁵ Wales are characterised by the number of ribs per inch

⁶ Blooming refers to the movement of the fibres after they are cut and separated during the manufacturing process

Section C: Scientific or Technological Advancement

Changing the direction of the gap in corduroy has a very significant impact on the textile production process and on the properties and processing characteristics of the textile. A new weaving process had to be developed and tested in order to meet the target properties.

The most significant change in the process, needed to achieve technological advancement, was the development of a new “slitting” method, which was perpendicular to existing methods. This new slitting method had uncertain effects on the properties and performance of the textile as well as on the subsequent manufacturing processes.

As a result of this work, TechStyle Fabrics added a new capability to their existing equipment to produce a product with new features, namely railroaded corduroy. This advancement in the weaving process enabled them to produce the first of a range of such three-dimensional fabrics, allowing the creation of a new product line.

Section D: Description of Work in the Tax Years 2003 and 2004

The company started with a polyester yarn that is currently used in other applications. This yarn was used primarily with an existing velvet weave construct. They modified the loom set up to leave gaps in the weft direction, changing the construction of the fabric, and then modified the slitters on their existing equipment to accommodate this change. As described in section B, this new weave pattern puts very different demands on the weaving equipment, especially the slitters.

Detailed Description:

Oct. 10, 2003 Trial 20984 1 Weaving trial – 1 dyeing and finishing trial
(10 meters/trial)

Changes: Textile construction modified to align loops in weft direction.
Slitters modified to accommodate this.

Evaluation: Meets abrasion requirements. Fabric appearance (bulk) and hand (softness) are reasonable, but the specifications are not met. Also the product is too expensive. Need to reduce pile by increasing spacing and remove slub filling to reduce cost.

Oct. 24, 2003 Trial 20986 1 Weaving trial – 1 dyeing trial with 2 finishing trials
(10 meters/trial)

Changes: Reduce pile by increasing spacing and remove slub filling to reduce cost.

Evaluation: Cost constraints are met. Product meets abrasion requirements. Fabric has poor appearance – it is too open, not enough pile. Needs to be redesigned to add more coverage.

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Nov. 26, 2003 Trial 20997 1 Weaving trial –1 dyeing and finishing trial
(10 meters/trial)

Changes: Construction modified to add more coverage.

Evaluation: Pile same as original sample 20984 but without slub in filling, and increased rib. Fabric looks too flat, not enough bulk and softness.

Decision is made to try in both cotton pile and poly cotton pile yarn.

Feb. 23, 2004 Trial 21004 2 Weaving trials –1 finishing trial (10 meters/trial)

Changes: Yarn is changed. Two different pile heights are tried to increase bulkiness.

Evaluation: Cost requirement is met, abrasion requirements not met. The fabric still lacks the softness and bulkiness that are the targets for this fabric.

Feb. 28, 2004 Trial 21009 2 Weaving trials – 2 finishing trials

Changes: Yarn change, now trying poly cotton in the pile to increase softness, two different pile heights tried, regular and tumbled finishes tried. (10 meters/trial)

Evaluation: Fabric now has the desired fullness, and meets the targeted selling price. Abrasion resistance still not met.

Pre-Production Runs

Mar. 4, 2004 Trial 21009A (200 meters)

Changes: Poly cotton pile is adopted and the first run is woven with thin latex backing to provide the required abrasion resistance.

Evaluation: Abrasion resistance and cost O.K.; hand O.K. but appearance is poor – the ribs are too clearly defined. With the new weaving process, too much of the back of the fabric shows between the wales. The “hand” could be fuller. It was decided to increase the burl (pile height) to 6mm for future production.

Mar. 30, 2004 Trial 21009B (600 meters)

Changes: Woven test yardage with increased pile height

Evaluation: Production OK. All specifications are met and the technological advancement has been made.

Final quality number is assigned 31004. Development proceeds to colour line production.

Status of the project at the end of fiscal year 2004

The work performed enabled the company to minimize the thickness of latex backing but not to eliminate it completely. The product is now in commercial production.

Section E: Supporting Information

- Market specifications, specifically target price and performance
- Weave specifications
- Trial warping, weaving and finishing instructions
- Lab test (abrasion results)
- Samples of material from each of the trials with comments

3. *Comments*

In order for the project to be eligible, it must be demonstrated that the work consists of a systematic investigation or search that was carried out in the field of textile technology, aimed at advancing that technology by experimentation or analysis.

The work described was carried out in the field of textile technology in a systematic manner.

In this case, TechStyle Fabrics performed work to change the construction of the product; in order to reach this goal, TechStyle had to modify their equipment to operate outside its normal range to define ways to weave a railroaded corduroy product. This required them to extend the capabilities of their current equipment, and the associated experimental work extended their knowledge base. As part of this work, they changed their “slitting” operations, which as explained in the text, created uncertainties in the manufacture and performance of the product. Short runs were required on the commercial equipment to produce railroaded corduroy that consistently had the required gaps between the piles, and met the mechanical requirements, within the cost constraints set by the new application. Therefore the project meets the definition of “Experimental Development” as given in paragraph “c” of subsection 248(1) of the *Income Tax Act*.

The project started in September 2003, when the company recognized that the desired product could not be manufactured on the available equipment using existing knowledge or techniques. They needed to perform experimental work on the equipment and process between October 2003 and March 2004 in order to develop a product with the slit in the weft direction.

The project finished when the company established a process that produces railroaded corduroy material, which has consistent, even gaps between the piles and that meets the technical properties. This occurred during the mill trial on March 30.

Commercial quantities of material were produced in the final trial. However, this trial was necessary to demonstrate that the process was stable under normal production conditions.

If the material produced in this (and the previous) trials is sold, then the recapture rules apply (Recapture of Investment Tax Credit, SR&ED 2000-04R2, www.cra-arc.gc.ca/taxcredit/sred/publications/sr0618-e.html).