Post Pull Test Report

Fast 2K™ Fence Post Backfill

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Introduction

Products manufactured by Royal Adhesives & Sealants Canada Ltd. (formerly Chemque, Inc.) have been used for the installation of telephone and other utility poles in the United States, Canada and Europe for approximately 15 years. The technology used on those products for utility poles generated Fast 2K™ Fence Post Backfill which is used to install not only wood, vinyl and metal fence posts but also to install mail boxes, signs and other posts.

Fast 2K is a two component product whose main benefits are its convenience and speed. A 26 fl oz bag of Fast 2K weighs approximately 2 lb and replaces two 50 lb bags of concrete. Fast 2K does not require water and expands to set posts in minutes. Users can start building the fence in 15 minutes after setting the post with Fast 2K.

The process of using Fast 2K involves mixing the bag and pouring its mixed content into the hole. Users mix a bag of Fast 2K for 30 seconds by rubbing it on a surface with a round edge such a step stool or a sawhorse or a table or an auger bit. This mixing process is known as the “shoe shinning” technique. After mixing the bag, users cut one of its corners and pour the mixed product into the hole. Fast 2K pours as a liquid and therefore requires narrower holes than concrete. For example, a 4x4 (10x10 cm) post can be set with Fast 2K in a hole with 6” (15 cm) diameter rather than in a typical hole with 8” (20 cm) diameter.

Unlike concrete, Fast 2K is waterproof when it cures which helps to protect wood posts against rotting and metal posts against rust. Fast 2K can also be used at high or low temperatures as long as the bag is kept at room temperature around 22-25°C (72-77°F) for at least two hours before using.

Description of Tests

Resistance to lateral force applied by a strong wind for instance determines how strong a fence is. Fast 2K has been tested against concrete for the installation of wood fence posts in regards to the resistance to lateral force. Resistance to lateral force is measured by the lateral force applied when the post or footing breaks. This test can also be described as “Post Pull Test”.

4” x 4” x H8’ (10 cm x 10 cm x H2.4 m) fence posts were set with Fast 2K and also with fast setting concrete. The concrete used is specifically recommended for setting fence posts and cured for 7 days whereas Fast 2K cured for 24 hours.

Fast 2K was poured into holes with two different diameters: 6’ (15 cm) or 8” (20cm). Concrete was only poured into holes with 8” (20 cm) diameter as concrete was too thick to pour into the 6” (15 cm) holes with the post inside.

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Two different hole depths were also tested to measure how stronger installations in a hole 3' (90 cm) deep would eventually be compared to installations in a hole 2' (60 cm) deep.

A lateral force was applied to posts at midpoint above ground until the system failed. System failure happens when the post or the footing made with Fast 2K or with concrete breaks. A load cell was used to measure the applied force at break or failure. The angle of deflection from vertical was also measured for each post.

Figure 1 shows how tests were performed.

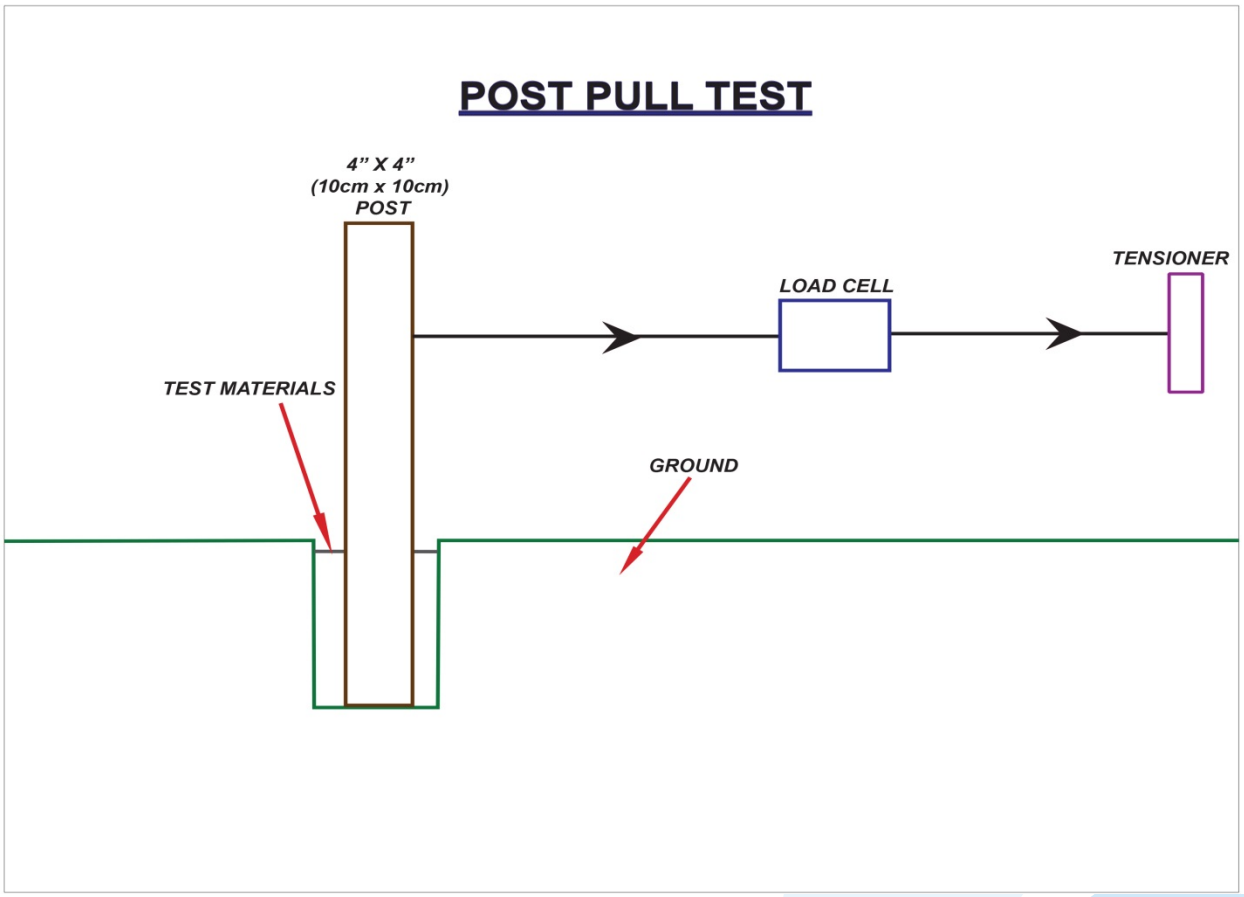

Figure 1

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Results

Posts broke in every single test with concrete footings immediately above the concrete footing. The angle of deflection at break in concrete/post systems was always 10° or less from vertical.

Posts not always broke with Fast 2K footings. When posts did break in Fast 2K/post systems, they broke immediately above the Fast 2K footing and with angle of deflection at break of over 12° from vertical. If there was no failure in the Fast 2K/post system at 12° angle from vertical, the test was stopped.

The post was always the weakest component in both Fast 2K/post and concrete/post systems. In other words, the post always broke before any damage could be observed in the footings. Actually, Fast 2K and concrete footings never broke or cracked.

As shown on Table 1 below, with holes 2' (60cm) deep, the Fast 2K/post system was approximately 9% stronger than the concrete/post system. With holes 3' (90 cm) deep, the Fast 2K/post system was 15% stronger than the concrete/post system.

Also as show on Table 1, the lateral force applied at failure for Fast 2K/post system was 8% higher for Fast 2K/posts set in holes 3' (90 cm) deep compared to those set in holes 2' (60 cm) deep. On the other hand, there was no significant difference of lateral force applied at failure for concrete/post systems between the two hole depths tested.

Table 1: Lateral Force Applied at Failure vs. Hole Depth

Hole Depth	2' (60 cm)	3' (90 cm)
Fast 2K	603 lb (274 kg)	650 lb (295 kg)
Concrete	550 lb (250 kg)	558 lb (254 kg)

The Fast 2K/post systems set in 6" (15 cm) diameter holes were stronger than the Fast 2K/post systems set in 8" (20 cm) holes by about 14%. Fast 2K/post systems set in 6" (15 cm) diameter holes were 26% stronger than the concrete/post systems set in 8" (20 cm) diameter holes. These results are listed on Table 2 below.

Table 2: Lateral Force Applied at Failure vs. Hole Diameter

Hole Diameter	6" (15 cm)	8" (20 cm)
Fast 2K	750 lb (341 kg)	650 lb (295 kg)
Concrete	N/A (concrete too thick to pour)	550 lb (250 kg)

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Discussion

Concrete is very rigid and therefore there is no give in it. In the concrete/post system, concrete did not absorb any of the lateral force. The wood post absorbed all the lateral force applied, bending until it reached its breaking point.

Fast 2K is less rigid than the concrete and unlike concrete, Fast 2K absorbed some of the lateral force applied to the Fast 2K/post system. With some of the force transferred to Fast 2K, it took a higher lateral force for the wood post to break in Fast 2K/post system than it did with concrete/post systems. In other words, a fence set with Fast 2K would be more resilient and resist to a stronger wind for example than a fence set with concrete.

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