involved in such designs it would be necessary to perform a series of full-scale-collision tests so as to determine the dynamics involved.

Mr. CONSTANDY. That would be 1952 or thereabouts?

Mr. BEATON. We started in 1952; right.

Mr. CONSTANDY. We had testimony from the gentleman from General Motors to the effect that when they began in 1958 to upgrade their proving ground they searched for research which had been done. I am not sure whether they mentioned being aware then of what you had done in 1952, but they had come to the conclusion there had been virtually little testing of guardrail median barriers for some 25 years. Did you find that to be true?

Mr. BEATON. This is true. We in 1952 started testing bridge curbs and rails and we worked on bridge structures almost entirely through the mid-1950's, and about the same time as General Motors started in 1958, we started testing and developing median barriers and did test some guardrails at that time. But that had been the first testing that we found in the literature since Missouri did their rather early, very early tests, in the 1930's.

Mr. CONSTANDY. So the standard for guardrail and median design in the early 1950's was not very high?

Mr. BEATON. That is right.

Mr. CONSTANDY. You found that what had been used as a standard was not effective?

Mr. BEATON. Right.

Mr. CONSTANDY. Mr. Beaton has a movie to show us at this point, Mr. Chairman. It is a sound picture. Do you want to say anything about it before we show it?

Mr. BEATON. Only that this picture is the latest picture we have developed and is on guardrails. This picture outlines the program that developed our present standard of guardrail that we are now using. It also includes some median barriers.

(Script of movie prepared by the State of California Transportation Agency, Division of Highways, Materials and Research Department, is as follows:)

Full scale dynamic impact tests such as this to develop and prove various highway barrier designs have been performed by the California Division of Highways since 1952 as a part of the continuing effort to improve the safety of California's highways. This film report presents the results of a recent series of tests performed to observe the effects that would result from certain proposed geometric and material modifications to the standard. California beam type median barrier and guard railing designs. The comparative results of eight full scale impact tests are shown. Four tests involve the median barrier design and four tests involve the guard railing design.

In the median barrier portion of this test series, the first test was conducted on the current standard double blocked-out beam design composed of a 12 gauge steel "W" section beam mounted 30 inches above the ground and a 6 inch structural steel channel centered 12 inches above the ground.

This initial test served as a performance base to compare the results of the modifications made in the succeeding three tests which include one test where the steel "W" section beam was retained but where a 12 gauge steel roll, formed "hat" section was substituted for the structural steel channel and two tests to determine the feasibility of using aluminum alloy members as alternates to the steel. Two thicknesses, 0.125 inches and 0.156 inches, of aluminum alloy "W" section beams were tested in designs utilizing a 6-inch structural aluminum alloy channel as an alternate lower rubbing rail.

This is our current standard beam-type median barrier, designed and tested in a dynamic test series conducted in 1958. This blocked-out design is used in medians less than 22 feet in width when warranted by traffic conditions.