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RESEARCH UPDATE

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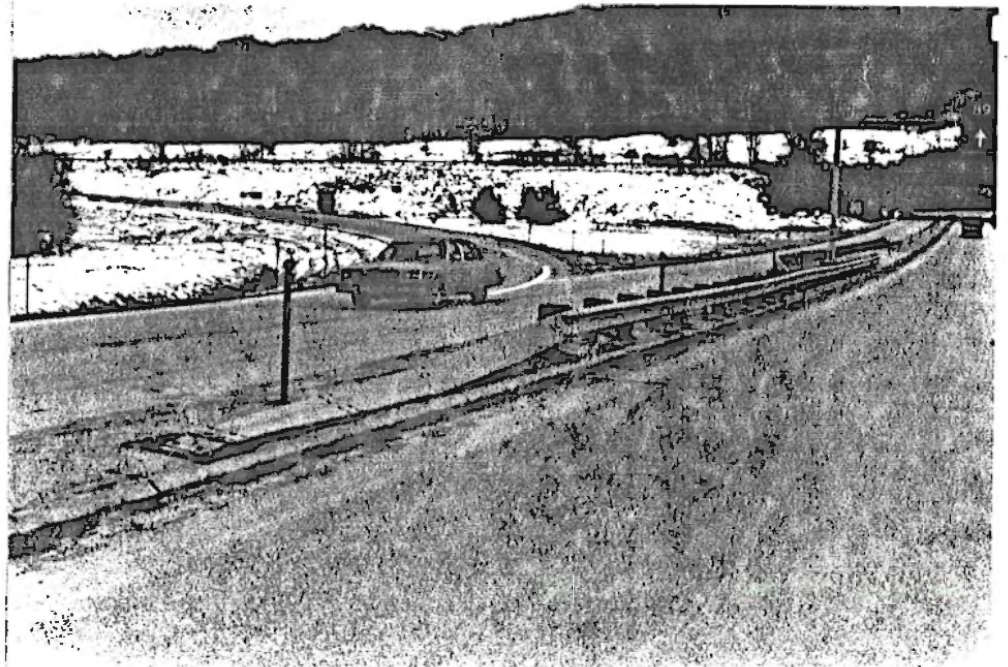
CONTROLLED RELEASING TERMINALS

REFERENCE: Work Plan No. 86-R-5

HISTORY: Most breakaway cable terminal, flared end, or other guardrail end treatments require space behind the guardrail line to allow for energy dissipation through deformation of the units with a resulting gradual slowing of the impacting vehicle. The treatment that does not require this space has been called the "Texas Twist" or turned down end section for W beam rail. The known disadvantages of this have been the "capture" of smaller vehicle (1800 lbs) tires and "roll over". To solve these problems the controlled release terminal was developed. The C.R.T. consists of a straight terminal "C" section 26'-10 and 1/4" long with the terminal end securely anchored to an 18" diameter, 5' deep underground concrete anchor. The turned down section is connected, via a transition section, to a straight rail section supported by modified wood posts 6'-3" apart. The posts are 6" x 8" x 72" modified by drilling 3.5" diameter holes through the posts at ground level and 16" below ground level. Attachment of the rail to the post is accomplished through certain unusual features which include a block out or spacer nailed to the wood post and a "bendaway" attachment which is connected to the post with a 5/8" bolt inserted through the post and screwed into the attachment. The other threaded end of the attachment is inserted through slots in the beam rail and attached with retaining rings rather than nuts. This system must begin well in advance of need (Minimum 150') and is designed so that the retaining rings will release the rail to fall off the posts if a vehicle attempts to climb the turned down section which could result in roll over.

INSTALLATION

During 1986, in conjunction with project Colchester-Highgate IR 089-3(57), two C.R.T. installations were made, at a unit cost of \$1600.00 each, on the ends of existing beam guardrail used to protect a tubular sign support located in the land of a two way access road from US-7 to I-89



at interchange No. 19 in the town of St. Albans Vt. Breakaway cable terminals on the same project were bid at \$650.00 each.

STATUS Reports that these rails had "fallen down" were confirmed by a District 8 maintenance inspection on June 16, 1987. The inspection revealed "absolutely no evidence of vehicle impact", yet the retaining rings, which hold the rail sections to the "Breakaway Attachment", had released or split and allowed 6 lengths on the easterly installation and 9 lengths on the westerly installation to "fall off". These rings are designed to release the rail when loaded and allow it to fall rather than to support a vehicle and cause "roll over". Lacking evidence of a collision, the District Transportation Administrator believes that snow and ice from winter plowing built up behind and atop the rail until the resulting weight caused the retaining rings to release.

PROJECTION During future winters this installation will be more closely monitored to see if the reinstalled rails will again release under snow load. If this occurs again a design change will be necessary to solve the problem.

