
Delineation of Karst Geohazards along Highway 652 through the Use of Ground Penetrating Radar, Culberson County, Texas

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ABSTRACT

Texas Ranch-to-Market Road 652 (RM 652) stretches for 58 miles, beginning 17 miles northeast of Orla, Texas, in Loving County. The road runs through Orla in Reeves County before culminating 41 miles west from Orla in Culberson County at the intersection of RM 652 and U.S. Highways 62/180. This study concerns the 34 miles, along RM 652, between the Culberson-Reeves county line in the east and the intersection between RM 652 and U.S. 62 in the west. The study area lies entirely within the Delaware Basin in the Chihuahuan Desert. The study area is of special geologic concern due to the evaporite karst geohazards that form beneath and immediately adjacent to the road. RM 652 is failing into these karst hazards due to greatly increased road traffic, related to growth in petroleum exploration and production in the area surrounding the road. Gypsum sourced from the Castile and Rustler formations was used to create the road base; meteoric and groundwater flow easily dissolves this road base. The increase in gross weight on the road accelerated the dissolution of the mainly gypsum road base. Characterization of the compaction and dissolution beneath the road surface will be undertaken through utilization of ground penetrating radar (GPR). The main focus of the study is the first half meter of the subsurface, including road base material, beneath the road surface due to the limitations of ground penetrating radar data. The geographic location and characterization of the karst landforms from GPR data has been used to create a geospatial map of potential geohazards.

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