This was a combined laboratory and field study, undertaken to assess the potential of pile run chat as a roadway base material. Chat is mine tailings from the abandoned mines in the Tar Creek area shared by three states, Oklahoma, Kansas and Missouri. Pile run chat does not have any cohesion and consequently any compressive strength in unconfined form. Pile run chat was stabilized with 10% class C fly ash (CFA) and 10% cement kiln dust (CKD), separately.

In the laboratory study, cylindrical specimens of chat stabilized with either CFA or CKD were molded and cured for 28 days. The cured specimens were tested for unconfined compressive strength and modulus of elasticity. Also, a non-destructive technique was used to determine the seismic modulus of stabilized specimens. Further, stabilized-chat specimens were tested for split tensile strength. From the laboratory study, it was found that the unconfined compressive strength (UCS) of pile run chat increased significantly due to stabilization using CFA and CKD as stabilizing agents. The compressive strength of pile run chat was so negligibly small that no specimen could be molded for testing. The elastic modulus of pile run chat determined from the unloading-reloading curve under uniaxial loading in unconfined compressive strength (UCS) testing also exhibited increase due to stabilization. Pile run chat showed marginal increase in the tensile strength after stabilization.

A 0.6 mile long test road was constructed near Miami, Oklahoma. The test road was divided into four different sections depending on the stabilizing agent used and the thickness of the base course. The road was paved with chat-asphalt and opened to traffic to observe its performance. Selected field tests, namely Ground Penetrating Radar (GPR), Falling Weight Deflectometer (FWD), and Spectral Analysis of Surface Waves (SASW), were performed to back calculate the pavement design parameters in a non-destructive way. GPR test data was used to determine as-built thicknesses of different layers in the pavement structure. The moduli values obtained from these tests were correlated with the laboratory modulus values.