

## STABILIZATION OF GRAVEL ROADS AND STREET SURFACES BY USE OF CALCIUM CHLORIDE

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Mr. Dow has presented a very clear and concise paper. The thing that strikes me so favorably is the avoidance of an air of mystery which could be thrown around a subject that is relatively unfamiliar to many highway engineers. The latter part of the paper would answer both as a specification and a guide to construction with the assurance that good results would follow.

The State Highway Commission of Indiana has tried only one 5½-mile project of this type. This has given gratifying results, so much so that more of this work is being planned this season. If this class of road surfacing does not go far in solving the secondary road problem by providing a splendid riding, dustless, and mudless surface, I will be greatly surprised.

The project tried by us this last season was on Road 44 just west of Franklin in Johnson County. The road before work started was a very dusty gravel road, subject of course to the usual malady of corrugating. Frequent dragging was necessary to keep the driving surface smooth. The dust was stifling. The road runs through a rich agricultural community and, being adjacent to the county seat, carried rather heavy traffic. The nature and size of the gravel did not lend themselves to the ordinary oil palliative treatments. Funds were rather limited, so naturally some cheap method of accomplishing the desired end had its appeal.

Clay was obtained close to the work and after analysis of several sources, a clay was picked which showed a plasticity index of 7. This was mixed with the road metal in an amount of 15% by weight. The road being weak, it was necessary to add additional metal, which increased greatly of course the average cost per mile of the finished job. The pit-run gravel used ran to considerable yardage, exclusive of some washed gravel used in the finished wearing surface.

We were unfortunate in encountering extremely dry weather for the work. Our water bill was almost \$200.00, and we were forced to use more calcium chloride than ordinarily we would have used.

I am sure that future work can be much more economically handled. It usually takes one project of new work to show what is needed. This I think we have learned.

One problem that presents itself just now is the development of a technical personnel familiar enough with this class of work to keep the field forces accurately within the limits

of proper proportions of road metal, silt, and clay. The work being so new, there is a very limited field to draw from, except the engineers of the different chemical companies, and on these we have leaned heavily. However, it is time we began to walk alone. The whole field is a challenge to the highway engineer who has the proper type of inquiring mind. There are many miles of secondary roads to which this class of surfacing lends itself admirably. It deserves serious consideration.

### U. S. COAST AND GEODETIC SURVEY EMERGENCY PROGRAM IN INDIANA

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Before considering details of the subject of this paper, it seems necessary again to remind this group of county surveyors that there are several federal agencies engaged in surveying and map making and that these agencies could be of much greater benefit if practicing local surveyors would take advantage of the services which these same agencies offer. Many bulletins and maps are available for your use, the data and information being the results of field work of a high degree of precision.

#### U. S. COAST AND GEODETIC SURVEY

The most important of these federal agencies is the United States Coast and Geodetic Survey, a bureau of the Department of Commerce. This survey was organized more than a hundred years ago and is charged with the establishment of precise triangulation, traverse, and vertical control over the land areas of the United States and its possessions. During the first half century of its existence, because of the pressing need of such information, the Coast Survey's operations were limited to hydrographic and topographic surveys along the coast lines of the country with emphasis placed on those harbors which were being used extensively.

During the last half century, the activities and importance of the Bureau have increased. With more and better equipment available, nautical charts have gradually reached the high degree of accuracy and reliability of today; and, in addition, much has been accomplished in the development of the control network of lines and elevations in the interior of the country. When complete, the primary triangulation net will reach from coast to coast and from Mexico to Canada. The chains of quadrilaterals will be spaced at intervals of about 25 miles and will average 10 miles in width. The whole system, as well as