

SUPPLEMENTAL SPECIFICATIONS
INDIANA DEPARTMENT OF TRANSPORTATION
1999 STANDARD SPECIFICATIONS

REVISION TO 1999 STANDARD SPECIFICATIONS

SECTION 215, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 215 -- CHEMICAL MODIFICATION OF SUBGRADE SOILS

215.01 Description. *This work shall consist of the modification of fine grained soils by uniformly mixing dry portland cement, fly ash, lime, or a combination of the materials with soil to aid in achieving the workability of soils having an excessive moisture content.*

MATERIALS

10 **215.02 Materials.** *Materials shall be in accordance with the following:*

<i>Fly Ash.....</i>	<i>901.02</i>
<i>Lime.....</i>	<i>913.04(b)</i>
<i>Portland Cement, Type I.....</i>	<i>901.01(b)</i>
<i>Water.....</i>	<i>913.01</i>

CONSTRUCTION REQUIREMENTS

20 **215.03 Testing and Mix Design.** *The Contractor shall be responsible for all tests required to determine the optimum chemical modifier content for modification of the soils. The modifier selection, laboratory testing, and mix design shall be performed by an approved geotechnical consultant in accordance with criteria contained in the Department's guidelines, Soil Modification/Stabilization Utilizing Chemicals. Test results, recommendations, and material compliance certifications shall be submitted to the Materials and Tests Division for approval at least five days prior to use.*

30 *The quantity of chemical modifier may be adjusted for different soil types. However, the source or type of chemical modifier shall not be changed during the progress of the work without approval. A change in source or type shall require a new mix design.*

215.04 Storage and Handling. *The chemical modifier shall be stored and handled in accordance with the manufacturer's recommendations.*

215.05 Weather Limitations. *The chemical-soil modification shall be performed when the soil has a minimum temperature of 7°C (45°F), measured 100 mm (4 in.) below the surface of the subgrade, and with the air temperature rising. The chemical modifier shall not be mixed with frozen soils or with soil containing frost.*

40 **215.06 Preparation Of Subgrade.** *The subgrade shall be prepared in accordance with 207. All aggregates which are larger than approximately 75 mm (3 in.) encountered before or after mixing the soils and chemical modifiers shall be removed.*

215.07 Spreading of Chemical Modifiers. The subgrade shall be scarified or disked to the specified depth prior to distribution of the chemical modifier. The chemical modifier shall be distributed uniformly over the subgrade by a cyclone, screw-type, or pressure manifold type distributor. The chemical modifier shall not be applied when wind conditions create problems in adjacent areas or create a hazard to traffic on any adjacent roadway. The spreading of the chemical modifier shall be limited to an amount which can be incorporated into the soil within the same work day. If weather causes stoppage of work or exposes the chemical modifier to washing or blowing, additional chemical modifier may be spread when the work resumes.

215.08 Mixing. The chemical modifier, soil, and water when necessary, shall be thoroughly mixed by rotary speed mixers or a disc harrow. The mixing shall continue until a homogenous layer of the required thickness has been obtained. One hundred percent of the material, exclusive of rock particles, shall pass a 25 mm (1 in.) sieve and at least 60% shall pass a 4.75 mm (No. 4) sieve. The loose thickness of a single chemical modified layer shall not exceed 200 mm (8 in.) if a disc harrow is used and 400 mm (16 in.) if a rotary speed mixer is used.

215.09 Compaction. Compaction of the mixture shall begin as soon as practicable after mixing. Compaction after mixing shall be as follows:

(a) Cement modified soils shall be compacted within 30 min.

(b) Fly ash modified soils shall be compacted within 4 h.

(c) Lime modified soils shall be compacted within three days.

If compaction of lime modified soils is delayed, the surface of the lime modified soils shall be crown graded and primed in accordance with 405. When compaction is resumed, it shall be continued until the upper 150 mm (6 in.) of the chemical modified layer has the soil density determined by mix design.

Maximum dry densities will be determined in accordance with AASHTO T 272 at the same time and location as each in-place density test is performed. The field in-place dry density shall be in accordance with AASHTO T 191 or AASHTO T 238.

Aeration or drying by further mixing, or the addition of water and further mixing, may be required to obtain the optimum moisture in order to achieve the required compaction. The final compaction acceptance will be in accordance with 203.26. The Contractor is fully responsible for achieving the required compaction.

215.10 Method of Measurement. The accepted quantity of modified subgrade will be measured by the cubic meter (cubic yard), complete in place. All excavation required to modify the soils below the specified depth will be measured in accordance with 203.27(b).

215.11 Basis of Payment. The accepted quantity of modified subgrade will be paid for by the cubic meter (cubic yard), complete in place. All excavation required to modify the soils below the specified depth will be paid for in accordance with 203.28.

Payment will be made under:

<i>Pay Item</i>	<i>Metric Pay Unit Symbol (English Pay Unit Symbol)</i>
<i>Subgrade, Modified.....</i>	<i>m3 (CYS)</i>

100

The costs of performing the laboratory tests, providing an approved geotechnical consultant, scarification of the subgrade, spreading and mixing of the chemical modifier and soil, priming of the surface of the chemically modified soils, compaction of the resultant mixture, shaping the subgrade, work required due to adjustments of modifier proportioning, additional modification required due to weather conditions, correction of deficient areas, water required for the modification process, modified subgrade trimming, and all other materials and operations needed to meet the requirements of this specification shall be included in the costs of the pay item.