

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

## Inter-Departmental Memorandum

**TO:** Design Team Leaders

**DATE:** November 21, 2002

**FROM:** Steven W. Reeves  
Quality Control Engineer

**SUBJECT OR PROJECT NO:** Pay Items

**INFORMATION COPY TO:**

**COUNTY:**

Roadway Design Division Engineer (Pickering)  
Assistant Roadway Design Division Engineer (Purvis)  
Special Projects Engineer (Boteler)  
Roadway Design Section Engineers  
Construction Division (Portera, Lewis & Funchess)  
District Engineers  
FHWA  
Files

Beginning with the January 2003 letting, we will be incorporating specification changes relating to lime-fly ash (LFA) stabilization, lime stabilization, soil cement stabilization, unclassified excavation and borrow excavation. These changes will require the addition of the 907 prefix to pay item numbers and, on projects that have LFA stabilization of either the sub-grade and/or granular material course, soil cement stabilization will need to be set up in the plans as an alternative bid item to LFA. The revised pay items are shown below.

907-203-A UNCLASSIFIED EXCAVATION (FM)  
907-203-A UNCLASSIFIED EXCAVATION (LVM)  
907-203-E BORROW EXCAVATION (FM) (CLASS\_\_\_\_)  
907-203-E BORROW EXCAVATION (FME) (CLASS\_\_\_\_)  
907-203-E BORROW EXCAVATION (LVM) (CLASS\_\_\_\_)  
907-203-EX BORROW EXCAVATION (FME) (AH) (CLASS\_\_\_\_)  
907-203-EX BORROW EXCAVATION (LVM) (AH) (CLASS\_\_\_\_)  
907-307-A \_\_\_"SOIL-LIME-WATER MIXING (CLASS A)  
907-307-B \_\_\_"SOIL-LIME-WATER MIXING (CLASS B)  
907-307-C \_\_\_"SOIL-LIME-WATER MIXING (CLASS C)  
907-307-D LIME  
907-308-A PORTLAND CEMENT  
907-308-B SOIL-CEMENT-WATER MIXING \_\_\_\_\_MIXERS (\_\_\_\_\_  
907-311-A PROCESSING LIME AND FLY ASH TREATED COURSE, (\_\_\_\_"  
THICK)  
907-311-B LIME  
907-311-C FLY ASH (CLASS C OR F)

The application rates for chemical treatment shown on the attached sheets are to be used to calculate estimated quantities for design purposes. Examples are shown for clarification. An example summary of quantities sheet is attached. Please use this example when setting up the soil cement stabilization and the LFA alternatives.

## CHEMICAL TREATMENT OF SUBGRADE

### LIME TREATMENT

Application rate = 6% lime by weight

Weight of soil = 100 lbs per cubic foot

Mixing: width (ft) x length (ft) x 1/9 = SY

Lime : width (ft) x length (ft) x depth (ft) x %lime/100 x 100# \cf x 1 ton/2000# = Tons

Example: Treating 100 ft of subgrade, 30 ft wide and 6 inches deep

Mixing =  $100 \times 30 \times 1/9 = 333.33$  SY

Lime =  $100 \times 30 \times 0.5 \times 6/100 \times 100 \times 1/2000 = 4.5$  tons

### LIME-FLYASH TREATMENT

Application rates = 3% lime by weight; 12% fly ash by weight

Weight of soil = 100 lbs per cubic foot

Processing: width (ft) x length (ft) x 1/9 = SY

Lime : width (ft) x length (ft) x depth (ft) x %lime/100 x 100# \cf x 1 ton/2000# = Tons

Fly ash: width (ft) x length (ft) x depth (ft) x %flyash/100 x 100# \cf x 1 ton/2000# = Tons

Example: Treating 100 ft of subgrade, 30 ft wide and 6 inches deep

Processing =  $100 \times 30 \times 1/9 = 333.33$  SY

Lime =  $100 \times 30 \times 0.5 \times 3/100 \times 100 \times 1/2000 = 2.25$  tons

Fly ash =  $100 \times 30 \times 0.5 \times 12/100 \times 100 \times 1/2000 = 9.00$  tons

### CEMENT TREATMENT (note: cement rates are measured by volume)

Application rate = 4% cement by volume

Weight of cement = 94 lbs per cubic foot

Mixing: width (ft) x length (ft) x 1/9 = SY

Cement: width (ft) x length (ft) x depth (ft) x %cement/100 x 94# \cf x Ton/2000# = Ton

Example: Treating 100 ft of subgrade, 30 ft wide and 6 inches deep

Mixing =  $100 \times 30 \times 1/9 = 333.33$  SY

$$\text{Cement} = 100 \times 30 \times 0.5 \times \frac{4}{100} \times 94 \times \frac{1}{2000} = 2.82 \text{ Ton}$$

## CHEMICAL TREATMENT OF GRANULAR MATERIAL

### Conversion Factors (CF)

Weight of granular material Class 1 & 2 = 1.7685 tons per cubic yard

Weight of granular material Class 3 & 4 = 1.7415 tons per cubic yard

Weight of granular material Class 5 & 6 = 1.7145 tons per cubic yard

Weight of granular material Class other = 1.5390 tons per cubic yard

### LIME TREATMENT

Application rate = 6% lime by weight

Mixing: width (ft) x length (ft) x 1/9 = SY

Lime : width (ft) x length (ft) x depth (ft) x 1/27 x %lime/100 x CF = Tons

Example: Treating 100 ft of Cl. 6, Gp. B granular material, 30 ft wide and 6 inches deep

Mixing =  $100 \times 30 \times 1/9 = 333.33$  SY

Lime =  $100 \times 30 \times 0.5 \times 1/27 \times 6/100 \times 1.7145 = 5.715$  tons

### LIME-FLYASH TREATMENT

Application rates = 3% lime by weight; 12% fly ash by weight

Processing: width (ft) x length (ft) x 1/9 = SY

Lime : width (ft) x length (ft) x depth (ft) x 1/27 x %lime/100 x CF = Tons

Fly ash : width (ft) x length (ft) x depth (ft) x 1/27 x %flyash/100 x CF = Tons

Example: Treating 100 ft of Cl. 9, Gp. C granular material, 30 ft wide and 6 inches deep

Processing =  $100 \times 30 \times 1/9 = 333.33$  SY

Lime =  $100 \times 30 \times 0.5 \times 1/27 \times 3/100 \times 1.5390 = 2.565$  tons

Fly ash =  $100 \times 30 \times 0.5 \times 1/27 \times 12/100 \times 1.5390 = 10.26$  tons

### CEMENT TREATMENT (note: cement rates are measured by volume)

Application rate = 4% cement by volume

Weight of cement = 94 lbs per cubic foot

Mixing: width (ft) x length (ft) x 1/9 = SY

Cement: width (ft) x length (ft) x depth (ft) x %cement/100 x 94#cf x Ton/2000# = Ton

Example: Treating 100 ft of Cl. 9, Gp. C granular material, 30 ft wide and 6 inches deep

$$\text{Mixing} = 100 \times 30 \times 1/9 = 333.33 \text{ SY}$$

$$\text{Cement} = 100 \times 30 \times 0.5 \times 4/100 \times 94 \times 1/2000 = 2.82 \text{ Ton}$$

The application rates and equations shown above are to be used unless otherwise advised. Application rates are to be shown on typical sections. If you have any questions, please advise.

SWR/swr

Cement

**SUMMARY OF QUANTITIES**

PAY ITEM NO.

PAY ITEM

UNIT

PRELIMINARY

FINAL

PAY ITEM NO.	PAY ITEM	UNIT	PRELIMINARY	FINAL
907-307-C	F. PORT-LAND-CEMENT MIXING (CLASS C)	SQ. YD.	100,000	
907-307-C	LIME	TON	1,280	
---ALTERNATIVE PAY ITEMS---				
907-308-A	PORTLAND CEMENT	TON	1,882	
907-308-B	SOIL-CEMENT MIXING (OPTIONAL MIXERS (BASE))	SQ. YD.	280,000	
OR				
907-311-A	PROCESSING LIME AND FLY ASH TREATED COURSE (6" THICK)	SQ. YD.	200,000	
907-311-B	LIME	TON	1,445	
907-311-C	FLY ASH (CLASS C OR F)	TON	5,778	

- ① INCLUDES 848 TON FOR TREATMENT OF SUBGRADE & 848 TON FOR TREATMENT OF GRANULAR MATERIAL
- ② INCLUDES 100,000 S.Y. FOR TREATMENT OF SUBGRADE & 100,000 S.Y. FOR TREATMENT OF GRANULAR MATERIAL
- ③ INCLUDES 876 TON FOR TREATMENT OF SUBGRADE & 770 TON FOR TREATMENT OF GRANULAR MATERIAL
- ④ INCLUDES 2780 TON FOR TREATMENT OF SUBGRADE & 2078 TON FOR TREATMENT OF GRANULAR MATERIAL

②  
③  
④

STATE PROJECT NO.  
MISS

**SUMMARY OF QUANTITIES**

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

PROJECT NO. \_\_\_\_\_

COUNTY \_\_\_\_\_

FILE NAME \_\_\_\_\_

DATE \_\_\_\_\_

REVISION \_\_\_\_\_

DRAWING NO. \_\_\_\_\_

SHEET NUMBER \_\_\_\_\_