

SPEER

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*J. Speer, III  
Roadway*

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

FORD  
GRAHAM  
MAUNEY  
WHIPPLE  
WILLIAMS

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EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

July 6, 2004

MEMORANDUM TO: Mr. K. J. Kim, P.E.  
Eastern Regional Geotechnical Manager

Mr. John Pilipchuk, L.G., P.E.  
Western Regional Geotechnical Manager

Mr. Mohammed Mulla, P.E.  
Assistant State Geotechnical Engineer

FROM: Njoroge Wainaina, P.E. *Njoroge Wainaina*  
State Geotechnical Engineer

SUBJECT: Shrink/Swell Factors

It has been brought to my attention that there may be some confusion as to how the Roadway Design Unit utilizes shrink and swell factors. In preparing plan sheets for bidding, the Roadway Design Unit always assigns a 1:1 shrink/swell ratio to hard rock regardless of the shrinkage factor recommended. The shrinkage factor is applied to the soil and weathered rock portion only. If we want Roadway Design to use a swell factor for hard rock, we should specifically instruct them to do so.

For projects with large amounts of hard rock, which would generally be in the mountains, we should specify a swell factor for hard rock in addition to the shrinkage factor. For example, on the A-10 (I-26) project, a shrinkage factor of 15 % (applied to soil and weathered rock) and a swell factor of 30 % (applied to hard rock) were recommended.

This memorandum is in accordance with the Roadway Design Manual. If there are any questions about this, please contact either Scott Hidden P.E. or myself at (919) 250-4088.

cc: Mr. Jay Bennett, P.E., State Roadway Design Engineer  
Ms. Cynthia Perry, P.E., Plan Checking Section Engineer

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