

Case 09-05 – Modifications to Sections 220 & 703 – Riprap Construction

Comments from 4/1/09 Meeting:

1. The top surface should be no higher than finished grade noted in the design to prevent the riprap layer from protruding above the design elevation. Specify the top elevation of riprap rock.

Response: Agreed. See revised paragraph on placement tolerance. Various specifiers have noted tolerances, with some of the better ones shown below:

ASTM D6825: The finished surface tolerance for the riprap layer should generally not deviate from the lines and grades shown by more than half (1/2) the maximum D50 stone size of the gradation range. Loose pieces, or pieces that are out of tolerance should be worked to interlock and stabilize them within the riprap layer.

City of Denver: The basic procedure shall result in larger materials flush to the top surfaces with faces and shapes matched to minimize voids. Surface grades will be a fault plane or as indicated, but projections above or depressions under the finished design grade more than 10% of the rock layer thickness will not be allowed. Voids will be filled completely with a well graded mixture of the remaining material that is securely locked between the larger stone. It is essential that the material between the larger stone be loose, and not easily displaced by flow or by vandalism. The remaining stone will also be used to provide subgrade that will achieve the proper grade for the surface stone. The stone will be consolidated by the bucket of the backhoe or by other means that will cause the interlocking of the material. The stream side of the riprap is to be uniform and free from bulges, humps, or cavities.

2. Present practices allow both rock to be hand-set into grout or grout to be poured over pre-placed riprap rock. Revise specification to note that grout is to be poured over placed riprap.

Response: Agreed. See new paragraph in Section 220.6.

3. Include a paragraph allowing for agencies to request integral color matching.

Response: Agreed. See new paragraph in Section 220.2.