

**D-2**

**GORDON**

**QUALITATIVE VS. QUANTITATIVE**

**Gaines, Roger A MVM**

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**From:** Gordon, David MVS  
**Sent:** Tuesday, September 03, 2002 3:42 PM  
**To:** Maynard, Stephen T ERDC-CHL-MS  
**Cc:** Gaines, Roger A MVM  
**Subject:** RE: qual vs quan

Steve, a portion of this is what I sent Andy in my comments to Revision 15. I hope it makes sense.

As explained in the Introduction, most dikes, weirs and river training structures are designed using the strictly qualitative approach of pure experience and intuition. However, this approach translates into a dimensional design during this process without any quantitative analysis.

Therefore, there exists a gray area between qualitative and quantitative analyses and the subsequent design processes. In the field of river engineering, there exists an undefined and unclear point where a qualitative analysis must become quantitative. All sediment transport modeling overlaps this point. During a model study, the modeler must use quantitative reasoning to make a qualitative analysis. This is the only means of analysis. A completely qualitative or quantitative analysis does not exist. The human mind and model cannot function with one without the other.

In a sense the model is quantitative because exact measurements are recorded and studied. However, the modeler must examine this quantitative data and convert it into qualitative thoughts and analysis. Then the modeler must use this qualitative analysis to convert back to quantitative reasoning with further use of the model. The process is then repeated over and over. At some point during this process, a quantitative design solution must be extracted. Therefore, the points at which reasoning changes from quantitative to qualitative and back to quantitative occurs is blurred. This process not only occurs in the modeling process, but within any river engineering design process.

The modeler or the designer must be the one to recognize the differences and select the times at which to use each type of analysis. It is impossible to approach sediment transport and river engineering in a quantitative sense. Every aspect of this field is truly qualitative because of what is currently known about the subject. The analysis of the model by the modeler must be both qualitative and quantitative. The final design solution recommended by the modeler must be quantitative although it was extracted from a qualitative analysis. For example, a model may suggest that raising dikes will increase depths in the navigation channel. What quantitative analysis exists that can allow the engineer to pinpoint what this elevation should be?

-----Original Message-----

**From:** Maynard, Stephen T ERDC-CHL-MS  
**Sent:** Tuesday, September 03, 2002 3:14 PM  
**To:** Gordon, David MVS; Gaines, Roger A MVM  
**Subject:** qual vs quan

Attached file contains pp from my conclusions.  
Steve  
<< File: temp99.doc >>