San Dimas Experimental Forest Watershed Modeling

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Fluid Similitude and Scaling

•The physical model is a much smaller scale than that of the actual SDEF
•Viscosity of water cannot be decreased to be the equivalent of the scaled down values
•Froude similitude and equivalent scaling factors are used to be able to accurately measure what is happening
•Media on the surface of the model will also not be exact compared to that of the actual SDEF
•There cannot be materials small enough to be the equivalent size for soil on the surface of the model
•Must be taken into account when calculating losses and collecting quantitative data

Figure 1: The San Dimas Experimental Forest

Material s and Compatibility

• Silicone does not permanently attach to smooth surfaces, thus it is fitting for mold making due to its non-stick properties
• Weld-On is a chemical adhesive for acrylic. It creates a permanent chemical bond between acrylic sheets
• Amazing Goop adheres to basically all materials, including wood, steel, and plastic
• Oil-Based clay does not dry out with the atmosphere, making it a non-stick material that is good for mold making
• Urethane resin is a two part mixture which starts as a liquid and then solidifies over a certain period of time; this makes for a shorter turnover rate for part production

Model

1. Contours made with AutoCAD Maps

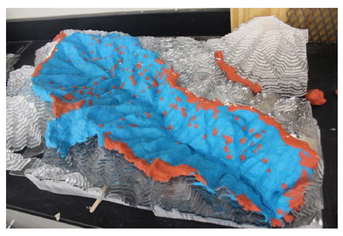
2. Contours cut using CO2 laser

3. Contours assembled

4. Contours adhered with Weld-On

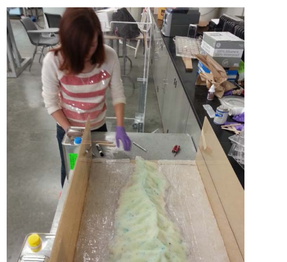
6. Tank assembled and caulked

5. Contours completely assembled



7.Oil-based clay added onto contours

8. Support and pipes added to box



9. Silicone mold created from contours with clay

10. Sprinkler system tested

11. Urethane part created

12. Urethane part de-molded

13. Urethane part painted

14. Model assembled and run for data

What's Next?

The next step in the San Dimas Experimental Watershed Modeling Project is to design for and implement a larger scale physical model of 15 ft x 10 ft. This will allow for further demonstration of watershed properties, more research capabilities, and further outreach information to the community. This digital and small scale physical model of the SDEF has paved the way for the next phase in watershed modeling.