



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Dylan J. Karlsson</b>	<b>Project Number</b> <b>J0710</b>
<b>Project Title</b> <b>Lessons Learned in Levee Construction from Katrina: Which Are More Effective, T-Walls or I-Walls?</b>	
<b>Objectives/Goals</b> <b>Abstract</b> My objective is to see which type of levee wall, an I-Wall Levee or a T-Wall, will better protect against a surge of flood waters as what happened with Hurricane Katrina. The levee system in New Orleans before Katrina had mostly earthen and I-Walls, with a small amount of T-Walls. After Katrina, T-Walls replaced many I-Walls. My project simulated an actual flood surge while testing these three ("3") types of levee walls. My hypothesis is that the T-Wall Levee with its added support, reinforcements, and better construction design will perform better than the I-Wall Levee in protecting against water breaches and in holding up against the water surge and that the I-Wall should provide better protection than an earthen levee. The lessons learned in levee construction from Katrina could be useful in improving the California levee system.	
<b>Methods/Materials</b> The project tests the strength of 3 types of levee walls with a simulated storm surge. These included: (1) an Earthen Wall, a control, (2) an I-Wall Levee, the typical design used for New Orleans# walls, and (3) a T-Wall Levee which has since Katrina been mostly used to better protect against water breaches. Each type of wall was placed in a testing tub and a water surge was sent toward the levee wall. The strength of each of the 3 walls was tested by noting the amount of time it took for the water to breach the wall. Both dry soil and then wet soil were tested.	
<b>Results</b> The T-Wall performed the best in 3 ways: 1) holding back the water surge from breaching the earthen mound and flowing from the water side to the land side of the testing tub, 2) preventing a breach of water in the middle of the earthen mound, and 3) in the levee not collapsing. The I-Wall performed better than the earthen wall. The T-Wall Levees 1) horizontal base, 2) larger sheet pile and 3) support pilings were more stable against the simulated storm surge.	
<b>Conclusions/Discussion</b> The testing proved my hypothesis: The T-Wall Levee was better in holding back the water surge from breaching the earthen wall, in preventing a breach of water in the middle and in not collapsing in comparison to the I-Wall. The I-Wall proved better in providing flood protection over the earthen wall. T-Wall Levees are twice as costly than I-Wall Levees but could be money well spent in areas next to cities and where there are many people who could become flood victims, such as in the Sacramento and Stockton areas.	
<b>Summary Statement</b> The rebuilding after Hurricane Katrina showed that T-Walls are better in flood prevention than I-Walls; can California learn from the lessons learned from Katrina ?	
<b>Help Received</b> My parents helped to purchase the materials and to undertake testing of the levee models as more than one person was needed to carry out the testing.	