



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Rebecca S. Lim</b>	<b>Project Number</b> <b>J1813</b>
<b>Project Title</b> <b>Glue Mania: Adhesive Bonding Efficiency Testing</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Objective-to find the components that lead to a successful bond,and from the data be able to find out the strongest and most effective adhesive.Purpose-to find the most efficient way to bond substrates, the components that lead to a successful bond, and find the best adhesive product. Hypothesis-Epoxy will be the strongest and longest lasting glue because it is known to be one of the most strongest household glues,can also cure all types of substrate surfaces in 90 seconds-1 hr.,and is very effective and quick.</p> <p><b>Methods/Materials</b> I have 40 Substrates(8 each):glass,paper/cardboard,aluminum,wood,plastic,4 different types of adhesives or glues: Epoxy, KrazyGlue, Carpenter Wood Glue, and Rubber Cement,8+weights-water cans, 1 Bucket1lb,20Clothespins,wooden-frame post;1+metal hooks,1lb scale Procedures: A.Produce a frame out of long wooden beams and form a rectangular post;B.Screw in metal hooks to the top of post;C.Get two substrates and create a simple lap joint by bonding two same substrates with each adhesive.(clean the surface);D.Label substrates,and clothespin the area bonded-wait for 4 hours.;E.Make two holes on ends of substrate and hang it from the metal wire on the post;F.On the other end hang a bucket of 1lb.and place weights on carefully;G.Wait until the bond breaks by tallying the results</p> <p><b>Results</b> Testing at home proved unsuccessful because only 7 specimens were able to break their bond.I have about over 200-300lbs of weights but the bond in all the substrates will not break.Due to danger I sent the remaining 13 substrates to a company that I have connection with.Home test results in, epoxy, carpenter wood, and krazy glue (1/4inchlap shear)reached over 35 lbs of weights. Highest RESULTS-single overlap shear joint for Krazy Glue Aluminum weighed 675.70 lbs.</p> <p><b>Conclusions/Discussion</b> Depending on the substrate surface and strength of adhesive, the bond will hold the most and never fall apart. Although my hypothesis failed, this testing proved that even the most commonly used craft glues(Krazy Glue)is stronger than Epoxy. How do I find the components that lead to a successful bond and be capable of making it secure while under a large amount of pressure?the adhesive, substrate, and surface pretreatment factors greatly impact the length of a bond's service time and using the right amount of glue and applying the right glue to the proper surface was the key to a secure bond.</p>	
<b>Summary Statement</b> To find the most efficient way to bond substrates, the components or factors that lead to a successful bond, find the best adhesive product, and find how this project will benefit others and our current society.	
<b>Help Received</b> Jimmy Quevedo helped provide information and suggestions; Martin Silva helped send pictures of machines; Inocencio Narez helped provide pamphlets; Used lab equipment or machines at Huntsman Advanced Materials Inc. in Los Angeles; Dad helped build framelike testing device.	