



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) David G. Goehring	Project Number S0207
--	---------------------------------------

Project Title
Preventing Pathogen Contamination in a Robotic Arm Specimen Tube Transport System

Abstract

Objectives/Goals
To determine the optimal tube transport carrier model, robotic arm tube gripper design, robotic arm gripper pad type, and Pressure (PSI) for proper extraction and insertion of medical blood test tubes into different automated testing lines.

Methods/Materials
#Specimen tube carriers, gripper pads, grippers, an air compressor, PLC (Programmable Logic Controller), PC (Laptop Computer) Robotic arm tube transport test stand, force gauge, and test tubes.
#Different carriers were tested for insertion force with different test tubes.
#Grippers, gripper pads, and air pressure (PSI) were tested for the slip force of different test tubes.

Results
#The FD (Final Design) carrier was best for test tube insertion, because of the minimal force required for the various test tubes to be inserted properly in the carrier when compared to the other carrier, gripper pad, gripper design, and air pressure (PSI) rating combinations.
#The B (60 degree modified) Design Gripper makes more contact with the tubes to be inserted properly into the FD tube carrier when compared to the other carrier, gripper pad, gripper design, and air pressure (PSI) rating combinations.
#The BP (Black) Gripper Pads grasped the tubes the best to sustain enough force for the tubes to be inserted into the FD tube carrier properly when compared to the other carrier, gripper pad, gripper design, and air pressure (PSI) rating combinations.
#The pressure set at 100 air pressure (PSI) gripper strength made for the best gripping force to prevent the tube from slipping in the robotic gripper arm and be inserted properly into the FD tube carrier when compared to the other carrier, gripper pad, gripper design, and air pressure (PSI) rating combinations.

Conclusions/Discussion
The data indicates significant improvement in the insertion and extraction of various test tubes into different automated blood testing lines using these optimal parameters: the FD Carrier Model with the BP Gripper Pad and the B Design Gripper at 100 air pressure (PSI) gripper strength.

Summary Statement
To test for the optimal settings for the proper extraction and insertion of various test tubes in a universal tube carrier to be transported to numerous automated testing lines and analyzers.

Help Received
Dad helped get the parts and I consulted with him on placement of parts and coding.