MSD Water Table Project Risk Assessment Overview

ID	Risk Item	Effect	Cause	Likelihood	Severity	Importance	Action to Minimize Risk	Owner
	Describe the risk briefly	*What is the effect on any or all of the project deliverables if the cause actually happens?*	*What are the possible cause(s) of this risk?*			*L*S*	*What action(s) will you take (and by when) to prevent, reduce the impact of, or transfer the risk of this occurring?*	*Who is responsible for following through on mitigation?*
1	Flow visualizer does not provide sufficient number of streamlines	Lose educational value in terms of visualizing fluid flow over test specimens. Loss of method to quantify flow straightness.	Electrolysis bubbles rise too quickly, beads/powders used do not provide adequate visualization	3	2	6	Tested electrolysis design in MSD I to determine feasibility. Researched previously used techniques that have been successful	Danny
2	System leaks	Water leaks, posing clean up issue and safety hazard, makes impractical for lab use	Failure to seal system, test specimen apparatus leaks, valves/ piping/ pump leak	1	3	3	Research/seek best sealing methods, test and iterate prior to building, test plumbing before assembly. Ordered assembled tank to reduce risk of leaking from tank itself. System tested, no leaks occurred.	John
3	Test fixture does not hold test piece	No way to demonstrate interesting flows, objective of project fails	Weak design/construction, no backup plans if test fixture fails, improper analysis during MSD I	1	3	3	Peer reviewed design, researched alternative holding methods, built safety factor into analytical calculations	Andrew
4	Water table declared unsafe for use	Electrical hazards, moving parts unsafe for interaction, thus, device would be declared not useable for use	Improper insulation of wire, improper grounding of components, not tested before MSD II for safety, safety official not consulted	1	3	3	Insulate all components, proper safety labels where appropriate procedures written, training of users with proper documentation, discuss design with safety official (Dave Hathaway), develop plan if hazard were to occur.	Danny
5	Cart breaks from loads	The cart is not enough of a robust design. The cart has a dynamic impact on something and breaks, water leaks	Improper analysis of forces on walls of water table tank and legs of table, not planned for odd cases or dynamic impacts	1	3	3	Verify calculations through analytical techniques and testing, plan for high static factors of safety, test pieces where applicable prior to building.	Andrew

6	Nozzle panels do not work due to falling over	Difficult to provide straight uniform flow, thus, eliminating ability to show laminar flow over objects	Weak design/construction, no backup plans if test fixture fails, improper analysis during MSD I	1	2	2	Peer review of design, researched alternative holding methods to provide if primary method fails, built safety factor into analytical calculations	Andrew
7	Baffle does not re-direct water as designed	High pressure causes water to be sprayed horizontally, affecting uniformity of water	Baffle design is not sufficient to handle the pressures needed.	1	2	2	Perform preliminary calculations on inlet, and test early in MSDII. Planning first test on 3/22/13.	Tim
8	Water Table does not provide straight flow	Flow visualization fails to demonstrate intended educational concepts due to improper flow.	Flow straighteners insufficient, incorrect table geometry, incorrect analysis.	1	2	2	Conducted hand calcs and CFD models; build early to allow for testing/iteration. Design incorporates removable nozzle panels to adjust test section geometry.	Tim
9	Flow velocity is not uniform	Flow velocity cannot be adjusted properly with flow rate hindering table adaptability.	Improper calculations, poor benchmarking, poor design.	1	2	2	Conducted hand calculations and used valid resources for benchmarking. Allow room in design for adjustability if intended design fails (i.e. sluice gate, manifold design, etc.).	Tim
10	Project goes over the budget	Not all needed parts bought, incomplete design, less optimal design	Improper planning, unexpected prices/constraints, additional parts needed	1	2	2	Plan properly, receive quotes during MSD I, build / manufacture parts in house, requested proper funds if needed in MSD I before DDR	Andrew
11	Customer needs/priorities change	Customer wants needs and specs to change. System needs to be possibly redesigned.	Customers decide they want more out of the design outside of the scope of the project or originally scoped.	2	1	2	Used derived scope of project and settled on customer needs and specifications as “shield”. Built robust detailed specification to alleviate ambiguity before MSD II phase.	John
12	Poor planning	Deadlines are not met. Project completion is late.	Improper scheduling of project deadlines, parts hard to machine / assemble, parts delivered slow, failure to consider lead times	1	2	2	Schedule deadlines with “cushion” and consult with faculty advisor regularly. Order long lead parts early. Anticipate long testing/debugging period for project.	John

13	Inconsistent team priorities	Team deadlines are not met. Conflict with team members. Project does not interface well.	Poor leadership and opposing team opinions. Team members are unwilling to compromise.	1	2	2	Establish team values and norms thoroughly. Facilitate team issues early. Make sure everyone's opinion is heard and considered. Consistently check project progress and perform team evaluations.	John
14	Team loses member	Team loses part of working force potentially delaying project	Team member loses interest in project, does not carry weight in project, team member drops out, team member becomes severly ill	1	1	1	Motivating team in project scope. Keeping everyone updated and involved in project. Becoming familiar with many aspects of the project.	John

Likelihood scale	**Severity scale**
1 - This cause is unlikely to happen	1 - The impact on the project is very minor. We will still meet deliverables on time and within budget, but it will cause extra work
2 - This cause could conceivably happen	2 - The impact on the project is noticeable. We will deliver reduced functionality, go over budget, or fail to meet some of our Engineering Specifications.
3 - This cause is very likely to happen	3 - The impact on the project is severe. We will not be able to deliver, or what we deliver will not meet the customer's needs.

"Importance Score" (Likelihood x Severity) – use this to guide your preference for a risk management strategy	
Prevent	Action will be taken to prevent the cause(s) from occurring in the first place.
Reduce	Action will be taken to reduce the likelihood of the cause and/or the severity of the effect on the project, should the cause occur
Transfer	Action will be taken to transfer the risk to something else. Insurance is an example of this. You purchase an insurance policy that contractually binds an insurance company to pay for your loss in the event of accident. This transfers the financial consequences of the accident to someone else. Your car is still a wreck, of course.
Accept	Low importance risks may not justify any action at all. If they happen, you simply accept the consequences.