

Designing a FRC Robot, a Team Approach

Andy Baker

President and Co-owner, AndyMark Inc.

FRC mentor since 1998, team 45

2003 Championship Woodie Flowers Award Winner

Ten tips from Andy



1. Pre-season tasks

- Build team
- Set team goals
- Determine leaders
- Set up resources
- Develop Skills



2. Kickoff

- Divide into equal sub-groups
- Watch Kickoff together
- No stragglers
- Know the game
- Brainstorm
- Start building the field
- Buy stuff

Day 0



3. Sub-Group Decision Process

- BRAINSTORM
- Organize & categorize ideas
- Focus on OVERALL GAME PLAY
- Critique, analyze, & eliminate ideas
- Pick best ideas
- Agree on overall design

Days 1-3



4. Design Presentations

- Audience – everyone!
- Sub-teams present design concepts
- Students lead, adults help as needed

Day 4



5. Disown, sleep and decide

- All sub-team concepts are team property
- Sleep on it
- Decide the following day



6. Make a decision

- Review and critique, using GP
- Discuss common ideas
- Make a Decision Matrix
 - Determine qualities and assign values
 - Rate each team's idea per each quality
 - Total each sub-team's points
 - Highest point total wins
- Focus on concept with highest point total
- Add common features from other concepts

		Sub-Teams							
Attribute	Weight	Blue		Red		Black		White	
		Simple robot, known designs, can score well and defend OK.		Complex robot, stretch designs, does all functions well if they work.		Simple robot, no risks, using easiest designs.		Complex robot, very risky designs, can do it all if it works.	
	1-5	Rank 1-5		Rank 1-5		Rank 1-5		Rank 1-5	
Speed	4	4	16	5	20	2	8	5	20
Power	4	3	12	4	16	4	16	5	20
Score-ability	5	4	20	5	25	3	15	5	25
Reliability	5	5	25	2	10	5	25	1	5
Defense	3	2	6	4	12	5	15	5	15
Easy to build	5	5	25	2	10	5	25	1	5
Innovation	2	2	4	4	8	1	2	5	10
Wow	2	2	4	4	8	1	2	5	10
Total points			112		109		108		110

Democracy should ensue... but a monarchy
may come about during an impasse



7. Putaside

● Mr. Bill Beatty, team 71

8. Design Assignments

- Drivebase
- Arm, grabber, etc.
- Lift, structure, etc.
- Software team (already in place)
- Finish the field
- Don't let slackers bring you down
- Reviews daily and weekly
- Weight and motor management
- To air or not to air
- Build 2?



9. Build a Robot

- Drive it early, by week 3
- Break it early, fix it early
- Weigh it down
- Meet build goals
- Give drivers 1 week to practice
- Give software team 2 weeks to debug
- Celebrate mistakes
- Make spares



10. Celebrate Success

- Have an open house
- Plan for fun, right before shipping
- Ship
- Practice, fix-it, and tweak



Thank you

Any questions?

