Project Plan

IPRO 352 – US EPA Design Competition for Sustainability : Market Potential of Recycled Tire Material
Illinois Institute of Technology, Spring 2005

Project Objectives:

- To create prototypes for real market applications that are successful
- To create a business plan which confirms a business opportunity of using recycled tire material
- To attract the attention of corporate and private investors and obtain funds to carry out additional work
- To fulfill all P3 requirements and place high in the P3 awards
- To fulfill all IPRO requirements

Project Background:

The P3 Award Competition sponsored by the Environmental Protection Agency seeks to motivate teams of college students to research, develop, and design sustainable solutions to environmental challenges. The first stage involved the awarding of 66 design project grants to colleges, universities, and other post-secondary institutions in the United States. The Illinois Institute of Technology (IIT) obtained one of these grants in 2004 for a project on providing real world solutions to convert scrap tires into various construction materials.

It is known that one-fourth of the 283 million tires scrapped in the United States was landfilled in 2003. In other countries, hundreds of millions of tires are put into landfills every year without being recycled. This exploits an enormous amount of land space, creates a high risk of toxic fires, breeds mosquitoes which spread life threatening diseases, and does not use valuable resources to their full capacity. This situation must be remedies immediately.

This project will bring two already-proven technological solutions into the business arena so that tire recycling will become economically feasible. These two proven technologies are solid-state shear extrusion (SSSE), a patented, non-cryogenic pulverization technology; and a new particle modification technology. Both were developed here at IIT. The SSSE process is capable of producing fine rubber particles at a far lower cost than competing cryogenic processes. The new particle modification technology enhances the properties of the rubber particles produced by the SSSE process and enables them to be used in previously unattainable applications such as low Volatile Organic Compounds (VOC) paint coatings, waterborne sport surfacing and near-zero

VOC powder coatings. Together, these technologies could result in a dramatic reduction of tires sent to landfills. Recycled rubber materials would be turned into environmentally benign polymeric coatings, inexpensive constructional materials, and other products for both developed and underdeveloped nations.

Team members will develop, test and refine a strategy to integrate these two proven technologies into the business world. The strategy will be planned and executed by a multidisciplinary IPRO team of IIT students in engineering, science, and business working under close faculty supervision. Materials will be prepared to create samples. Based on sample testing, test marketing analysis, and evaluation an optimal business model will be designed. If this project becomes a success, this tire recycling IPRO project will become a model in the curriculum for future generations of students, demonstrating a successful effort by a multidisciplinary team working together to solve an environmental problem of planetary significance.

Research Methodology:

- Understand and identify project parameters
- Identify what would make the project a success
- Create project objectives, tasks to accomplish
- Plan and implement organizational structure

Technical Group
- Create prototypes
- Test prototypes
- Document test results
- Analyze results
- Refine prototypes

Business Group
- Perform market research
- Test marketing analysis
- Document test results
- Analyze results
- Create optimal business model

- Deliver P3 presentation package
- Deliver IPRO website
- Deliver IPRO exhibit poster and oral presentation
- Deliver completed business plan, team information, comprehensive deliverables CD
- Attend P3 award ceremony in Washington DC

Expected Results:

The IPRO team will create two prototypes using the processed recycled rubber: a coating/paint item and a soil substitute item. These two prototypes are expected to be

competitive in their respective markets. The envisioned final projects will have significant economic or functional advantages over pre-existing comparable products.

A business plan will be created to introduce these two items to their respective markets. It is expected that the plan will convince others that the technology to create inexpensive recycled tire material should be integrated into the production of various construction materials. The team anticipates that public or private investors will be excited by the results of this project and will give future teams funding to continue these efforts.

The IPRO team will fulfill all P3 award requirements, fulfill all IPRO requirements, and provide all IPRO deliverables.

Project Budget:

Itemized budget

Categories	Sept. 2004 – May 2005	
a. Travel	Federal	Cost-share
Airfare		$800
Lodging		$800
Meals		$360
TOTAL TRAVEL COSTS		$1960
b. Equipment		
Spray gun	$5000	$450
Scrub abrasion tester	$5000	$50
TOTAL EQUIPMENT COSTS	$10,000	$500
c. Supplies		
Laboratory		$3000
Office		$300
TOTAL SUPPLY COST		$3,300
d. TOTAL PROJECT COSTS	$17,132	
e. COST-SHARE	$5,760	
f. INDIRECT COSTS	$1,372	
f. TOTAL REQUESTED FROM EPA	$10,000	

Schedule of Tasks and Milestone Events:

January 24th	Understand and define project
January 26th	Objectives set and organizational plan developed
January 31st	Groups and team leader assignments made
February 4th	Project Plan DUE
February 7th	Group Meeting
February 14th	Group Meeting
February 21st	Group Meeting
February 28th	Group Meeting
March 7th	Group Meeting
March 21st	Group Meeting
March 25th	IPRO Mid-term Review DUE
March 28th	Group Meeting
April 4th	Group Meeting
April 11th	Group Meeting
April 12th	Completed P3 presentation DUE –prototype research FINISHED
April 18th	Group Meeting
April 22nd	Finished IPRO website DUE
April 25th	Print Exhibit Poster PRINTED & one page Abstract DUE
April 27th	Final and oral presentation DUE
April 29th	IPRO Day : presentation
May 6th	Completed business plan DUE Team information DUE Comprehensive Deliverable CD DUE
May 16th – 17th	P3 Award Ceremony in Washington DC

Individual Team Member Assignments:

Organizational structure

Project manager	Zheyan (Jennifer) Chen
Technical group leader	Dimitre Kolev
Technical group	Dan Cornelius
	Anel Medrano
	Jean Cadet
	T. (Puifai) Santisakultarm
Business group leader	Marc Glanton
Business group	Rania Hallak
	Andrew Battaglia
	Jinit Patel (JP)
	Erica Fierro
Multimedia and new applications group leader	Julie Chandler
Multimedia and new applications group	Susanna Arguijo
	Patrick Bowles

Tasks Assignment

Entire Group	Understand and define project Set objectives and develop organizational plan Make groups and team leader assignments Keep weekly timesheets
Project Manager	Keep a holistic eye on the team to make sure everyone is moving in the right direction Keep everyone informed of what they should be doing and how they are contributing Ensure the efficient utilization of resources by analyzing timesheets Lead team leader meetings Introduce group meetings, give overview of "the big picture" for the week Manage outside opportunities and distractions Ensure documentation of the entire process Make agenda for Monday and team leader meetings Assign the writing of minutes and a tasklist during meetings Research ethics involved in the project

Technical leader and group	Create and test prototypes Document test results and analyze results Refine prototypes
Business leader and group	Perform market research and analysis Test marketing analysis Document and analyze test results Create optimal business model Deliver final business plan
Media/apps leader and group	Document project process with photos and other media Deliver website Deliver presentation for P3 and IPRO Deliver poster for IPRO Compile Comprehensive Deliverables CD
Team leaders	Deliver IPRO Midterm Review Deliver presentation for P3 and IPRO Deliver poster for IPRO IPRO presentation