Design of an ergonomic coffee basket to increase worker productivity and comfort

DESIGN OF AN ERGONOMIC COFFEE BASKET TO INCREASE WORKER PRODUCTIVITY AND COMFORT

UNDERGRADUATE RESEARCH COURSE PROJECT

Iraida N. Martínez Velazquez[1], Amanda D. Moreno Hernández[1], and Dr. Cristina Pomales-García[2]
Department of Industrial Engineering, University of Puerto Rico, Mayaguez Campus
Undergraduate Student [1], Professor [2]

ABSTRACT

Our work aims to design a coffee harvesting basket with supporting mechanism to increase productivity and comfort, focusing on the needs of Puerto Rican workers. Impacts in worker strain and comfort will be assessed using mixed methods approach (i.e. biomechanical analysis, questionnaires, voice of the customer and user testing). With the proposed basket design and harvesting methods improvements, we expect an increase in productivity, comfort and reduction in worker strain. Basket design ideas will asses the shape, fit, weight, support and related work methods for the harvest activity.

BACKGROUND

In 2013, the Bureau of Labor Statistics reported a total number of recordable cases of nonfatal occupational injuries and illnesses of 5.5 out of 100 workers in Corp Production [1]. Still many factors may undermine the injuries and Musculoskeletal Disorders (MSD's) suffered by farmers, as national statistics show that only 4 to 10% of farms are subject to the OSHA reporting requirements because they employ less than 11 workers [2]. Previous attempt to design coffee harvesting basket show no effect on productivity, a small reduction on worker-reported pain, increased strain on upper back and shoulders, and increased muscle activity [3]. A preliminary study showed evidence of stress on the worker's shoulders and back due to carrying 30 pound bucket and 90 pound bag, and excessive over the shoulder movements during harvesting. Evidence of upper body postural evaluation suggested further investigation and changes to reduce workers, and the development of MSD's. Figure 1 shows a model comparing the loads for current basket and proposed design using 3DSSPP.

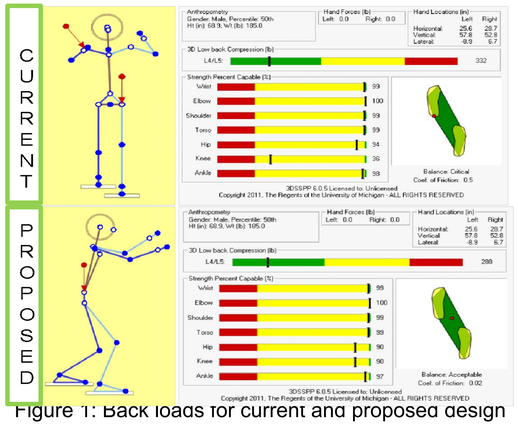


Figure 1: Back loads for current and proposed design

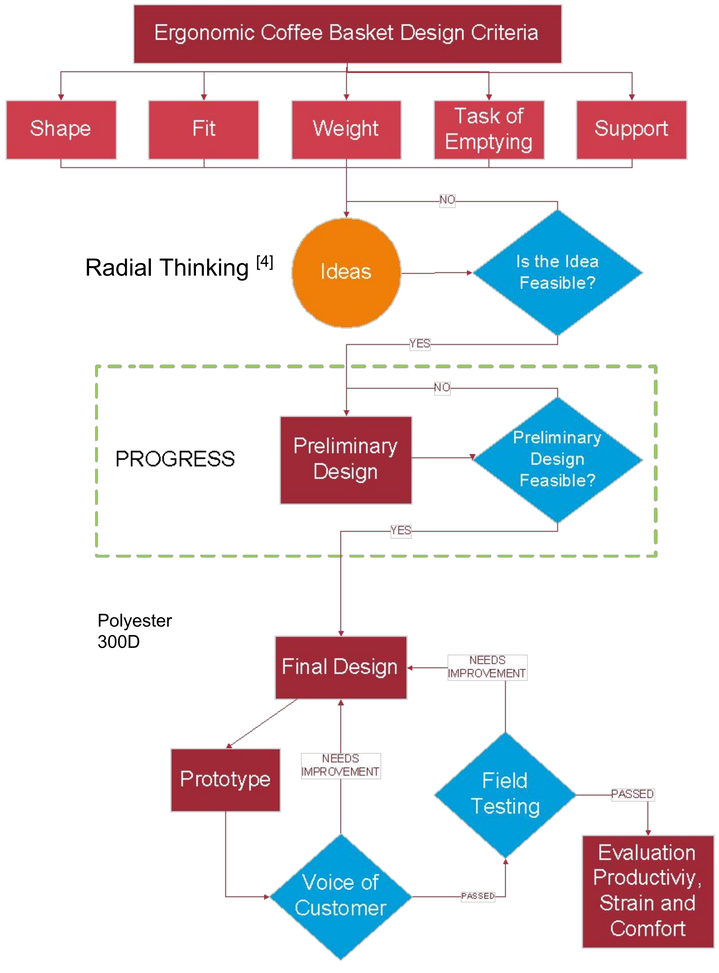
OBJECTIVE

- Design a new coffee harvesting basket with corresponding accessories to increase productivity, worker's comfort and reduce

AKNOWLEDGEMENTS

- Support of workers from Hacienda Candelaria in Yauco who participated in the preliminary study.

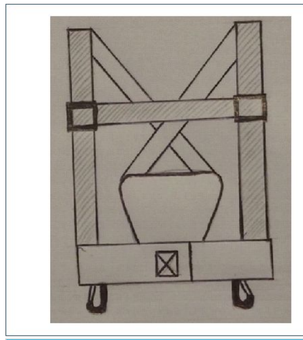
METHODOLOGY



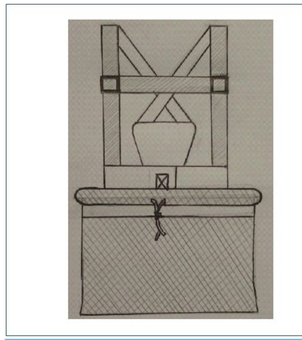
Morphological Chart [5]

Component	Idea 1	Idea 2	Idea 3
Basket Ring	Aluminum	Kidney shape	Garbage Can
Waist Support	Carabineer	Back Belt	Leather Belt
Shoulder Support	Safety Harness	Hiking Backpack	Shoulder Support
Harvesting Bag	Polyester 600D		

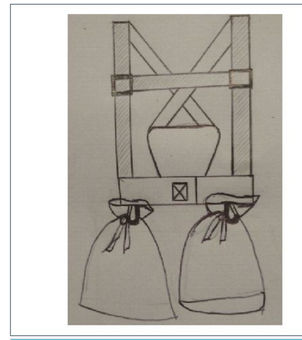
DESIGN AND SPECIFICATIONS



Basket Ring with Waist and Shoulder Support



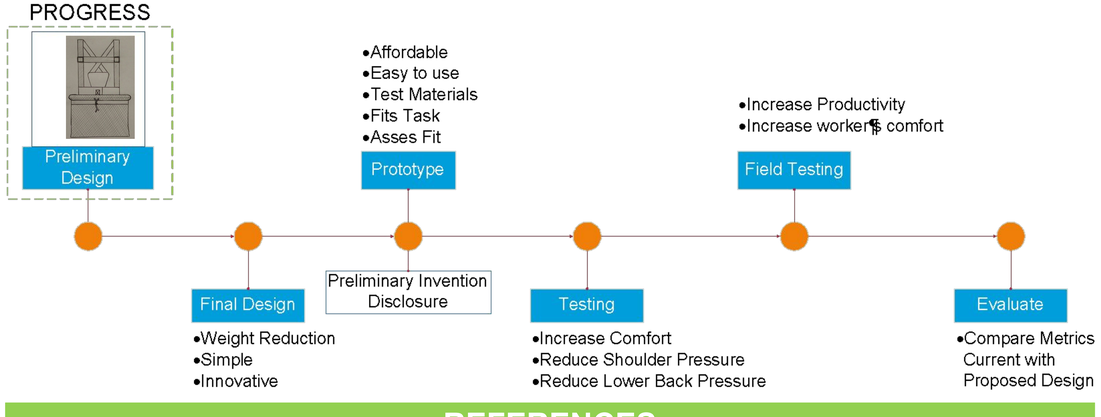
Basket Ring with Waist and Shoulder Support and Harvesting Bag



Coffee Harvesting Basket with Full Harvesting Bags

Design Component	Length (in.)	Depth (in.)	Width (in.)	Material
Basket Ring	18	~12	3	Aluminum
Waist Support	Adjustable	0.25	~7-7.5	Polyester
Shoulder Support	Adjustable	1.5	Adjustable	Polyester
Harvesting Bag	16	~12	14	Polyester,Nylon

FUTURE WORK



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