



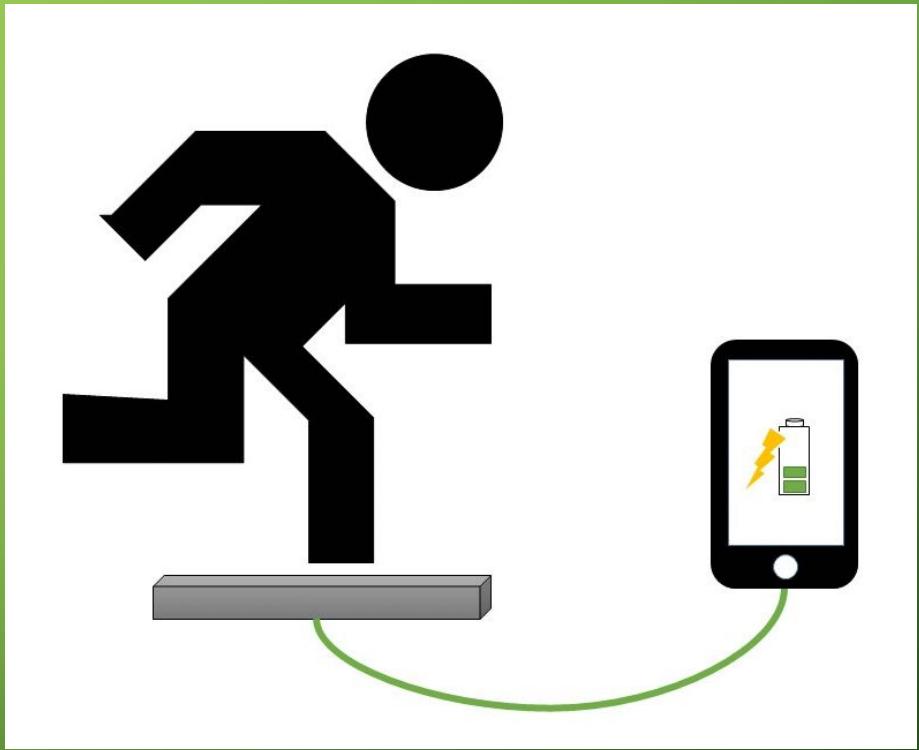
POWER FLOORS

GENERATE ELECTRICITY AS YOU WALK

<u>Team A</u>	
Yash –	Project Manager
JB –	System Manager
Joe Vizanko –	Manufacturing Manager
Sankalp –	Engineering Manager
Helen –	Quality Manager
Ramya –	Finance Manager

INTRODUCTION

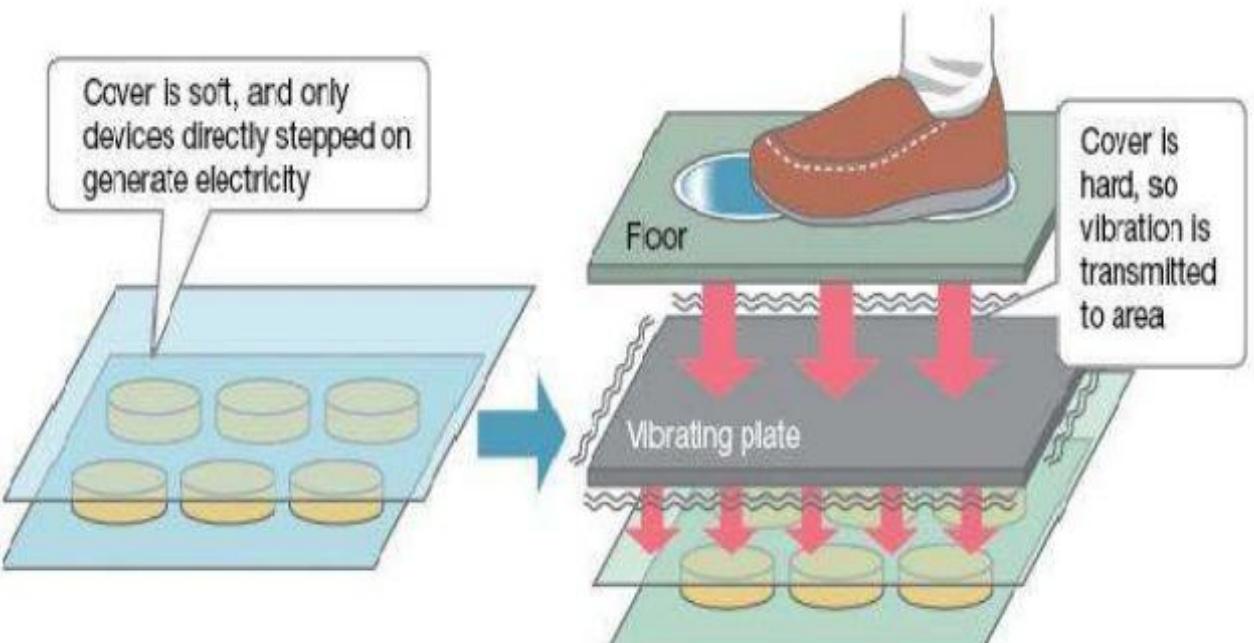
- 10 Trillion Global Construction Industry
- Sustainability & Green Construction always a Trend
- LEED Certification
 - Leadership in Energy and Environmental Design (LEED)
 - Credits for "Green" infrastructure
 - Recognized Worldwide
 - Energy & Atmosphere most weight
 - Tax breaks in some states



POWER GENERATING FLOOR

- Placed in areas of high foot traffic, these tiles can generate renewable energy
- Our product will give the extra push that builders need to achieve their goals in the form of LEED points
- Additional Advantages
 - Functions in any weather conditions
 - Produces no noise pollution
 - Has no hazardous byproducts

Special flooring tiles with piezoelectric crystals to generate electricity



TILES CAN HAVE STYLISH DESIGN

Interlocking system has no wires, Tiles can be replaced if necessary

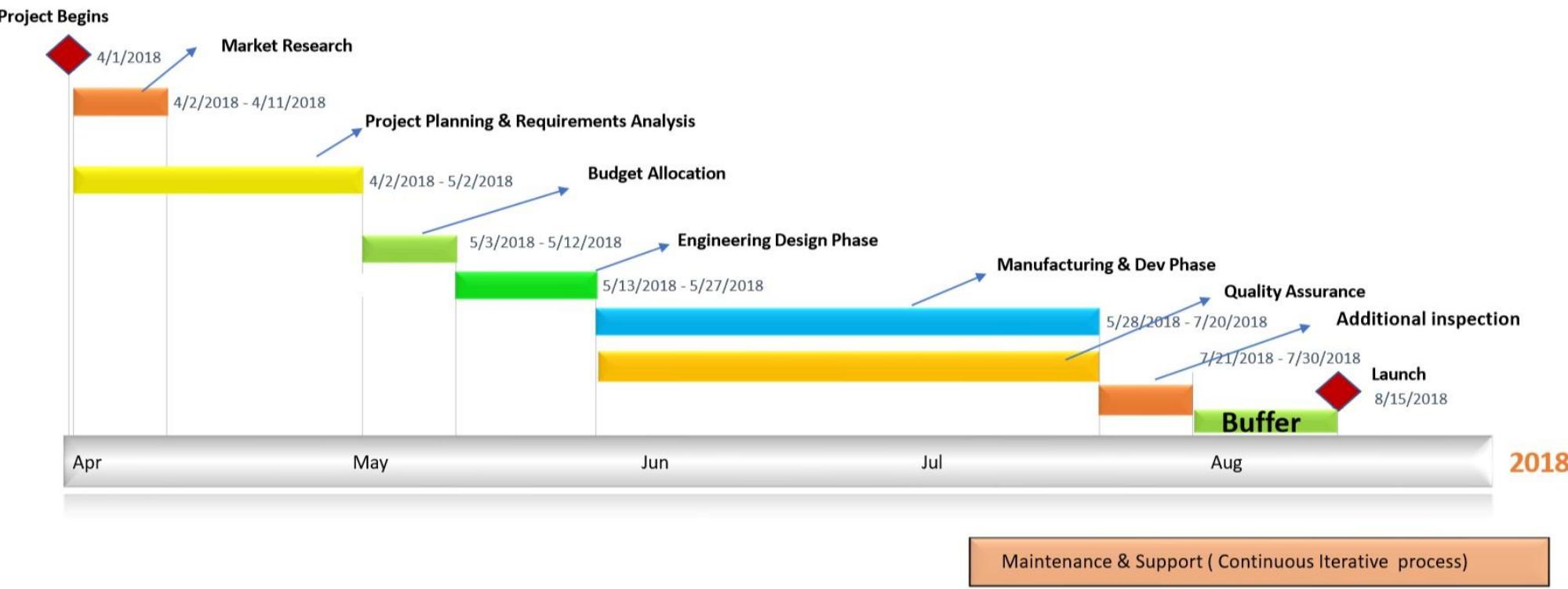


ENERGY SAVINGS

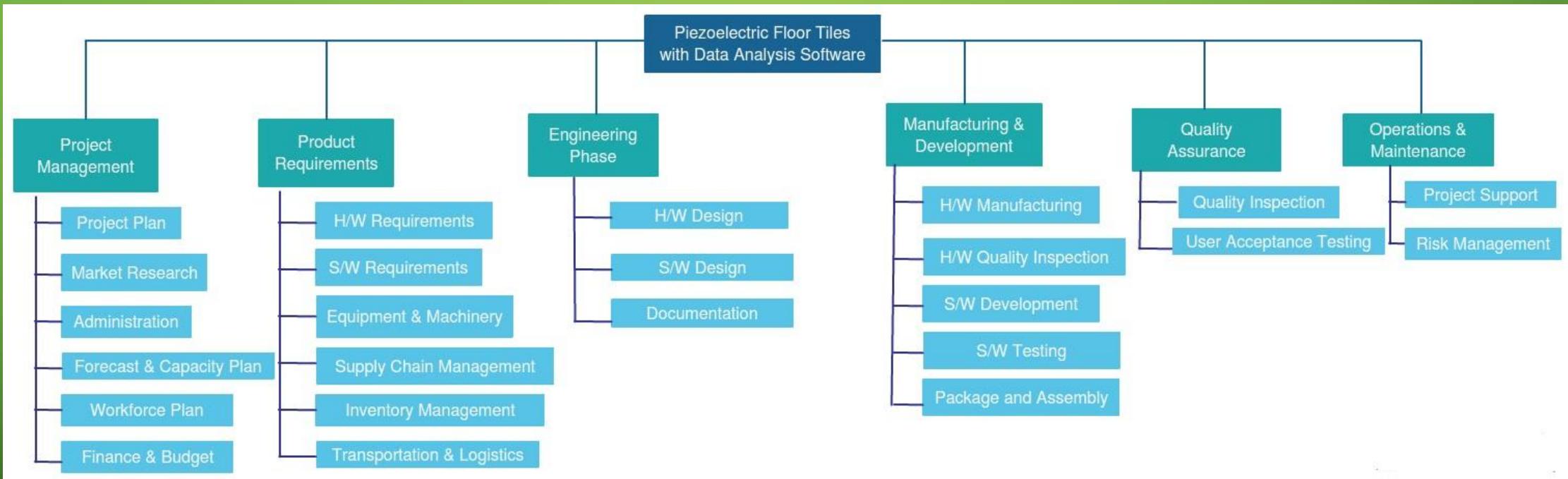
- Power Generated per Step
 - 4 Watts
- 10,000 ft² Building with 100 employees
 - 4,000 ft² Walking Space
- Power Generated (4 Watts)
 - 150 KWh
 - Can power ~1000 15W lights for a day
- Benefits
 - LEED points
 - Small energy savings
 - Possible tax breaks
 - Monitor Flow of Traffic



Road Map



PLAN - WBS



EXISTING FACILITY – National Electronics, Inc

1. State of the Art Facility

1. Design
2. Manufacturing
3. Testing

2. Currently Looking for new Product Lines

3. Fully Staffed



PROJECT PLAN - ENGINEERING DESIGN PHASE

1. Tile Material

1. PZT Material (Piezo Material)
 1. lead zirconate-titanate
2. Need to be as strong as other tiles

2. Performance

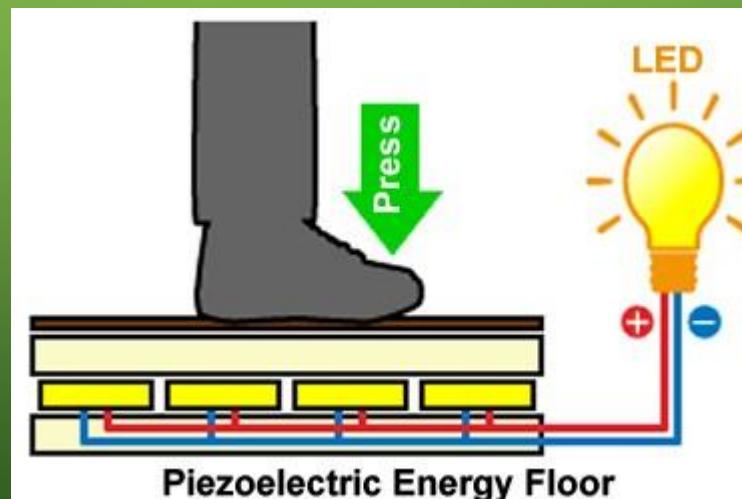
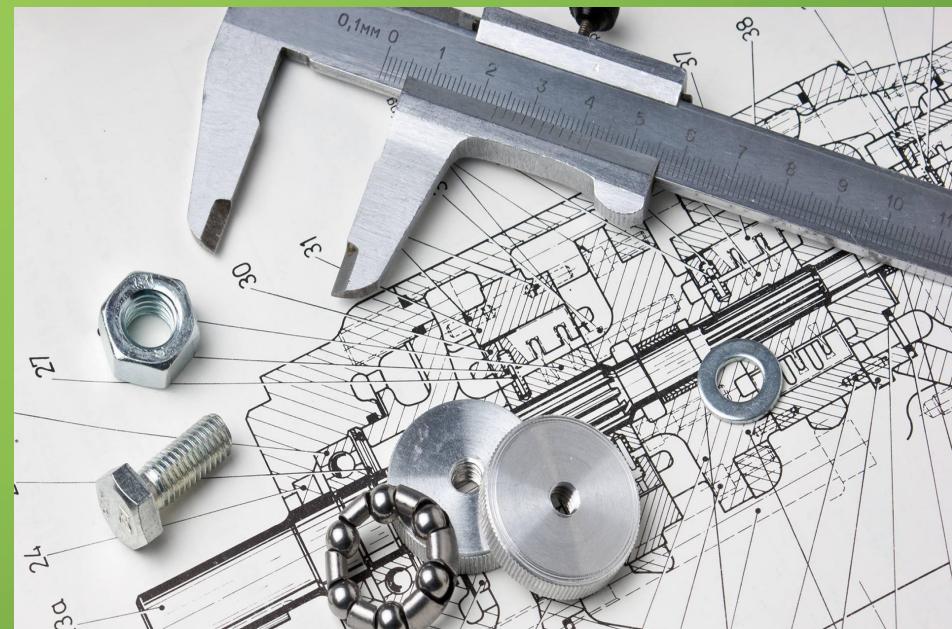
1. Generate 4 Watt per Step

3. Connection

1. Interlocking tiles (no wires)

4. Systems

1. Power Monitor
2. Website
3. Hook into Power Grid
4. Software



PROJECT PLAN - MANUFACTURING AND DEVELOPMENT PHASE

1. Equipment

1. Assembly
2. Electrical Testing
3. Environmental Testing
 1. Vibration, Shock, Temperature
 2. Water-Proof

2. Build 25 Tiles

1. Test Each individually
 1. Electrically
 2. Environmentally

3. Build Mock Room (25 Tiles)

1. Test entire matrix of tiles
 1. Power
 2. Monitoring
 3. Software



PROJECT PLAN – INSTALLATION PHASE

1. How to actually install Tiles

1. Interlocking Tiles
 1. Screw Down, no glue
2. Need to be able to remove incase one fails

2. Regular contractor can install

1. Test each Tile during install
2. One of our Technicians will be present

3. Installation Instructions

1. Tiles
2. Monitor



COST

	Design Phase		Manufacturing Phase		Installation Phase		
	Qty	\$\$/day	Qty	\$\$/day	Qty	\$\$/day	
Engineers	2	\$922.00	2	\$922.00	0	\$0.00	
Software Engineer	1	\$461.00	1	\$461.00	0	\$0.00	
Assembler	1	\$230.00	2	\$460.00	0	\$0.00	
Test Technicians	1	\$308.00	2	\$616.00	1	\$308.00	
Materials (1 Tile)	1	\$15.00	25	\$375.00	25	\$250.00	
Overhead (Equipment, Facilities)	1	\$2,400.00	1	\$2,400.00	N/A	N/A	
Total		\$4,321.00		\$4,859.00		\$308.00	
Days	10	\$43,210.00	40	\$194,360.00	3	\$924.00	\$238,494.00

	Yearly Salary	Per Hour
Engineer	\$120,000.00	\$57.69
Assembler	\$60,000.00	\$28.85
Test Technician	\$80,000.00	\$38.46
Existing Facility	N/A	\$300.00

Estimated Cost of 1 Tile		
	Minutes	Cost
Assembly	4	\$3.85
Testing	3.5	\$1.68
Packaging	0.5	\$0.32
Material	1	\$15.00
<i>(~8 tiles/hr)</i>		\$20.85

10000 Square Foot Facility		
Tile	Sell for \$50	Cost \$20.85
4000 Ft ² Tiles	Installation \$200K	Profit \$116K
7400 Ft ² Tiles	To break even	

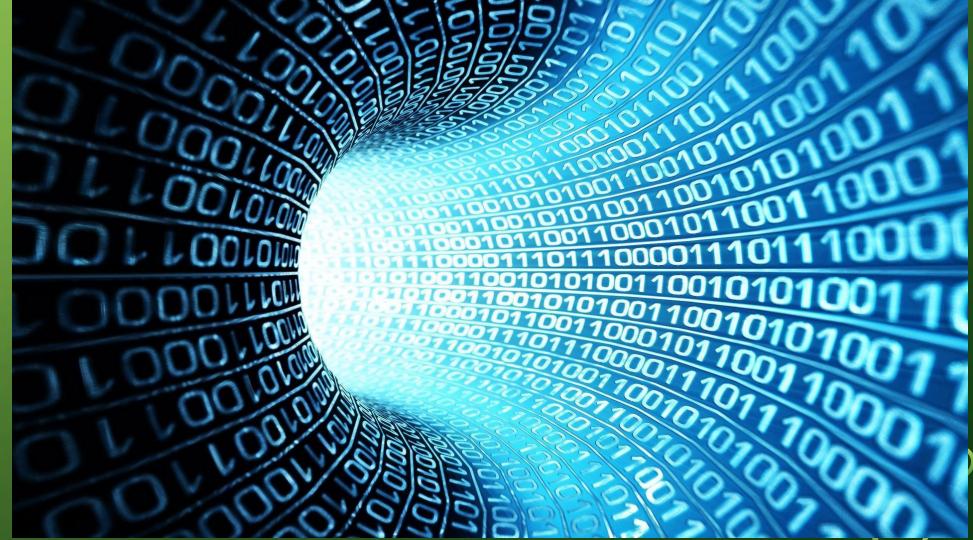
RISKS

- Engineering
 - Performance not adequate
 - (We have a working prototype)
- Manufacturing
 - Low Yield
 - Tracking Defects, SPC (statistical process control)
 - Design for Manufacturing Phase
 - Schedule Delay
 - Daily Status Meetings
- Installation Risks
 - Customers Schedule
 - Functionality
 - Test as we build each tile
- Software
 - Fully tested and debugged



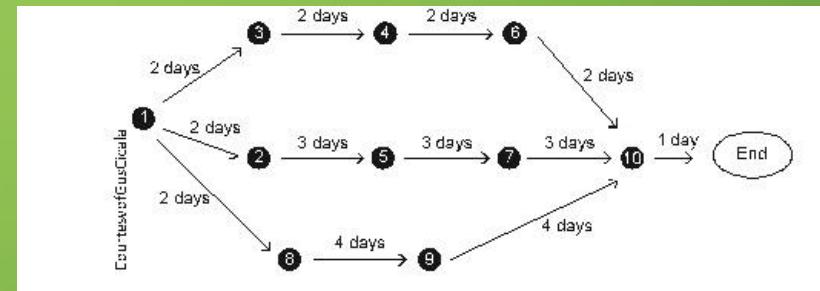
SOFTWARE

- Data Packet
 - Each Tile
 - Address of the Tile
 - Time Stamp
 - Voltage
 - Database
 - Mine Data
 - Foot traffic
 - Tile Defects
 - Front End
 - Display Charts and Graphs
 - SPC



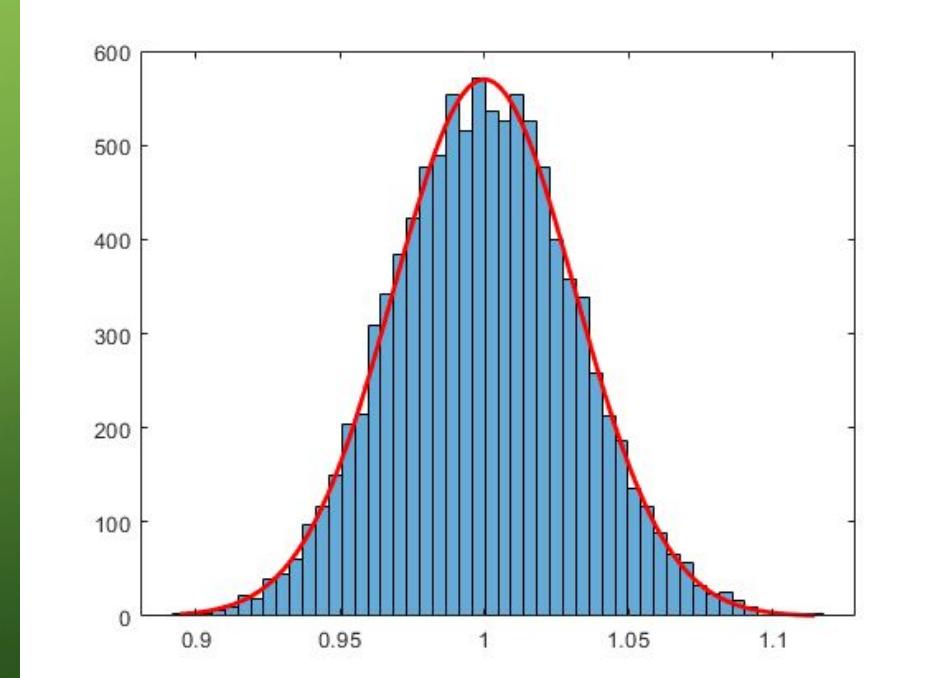
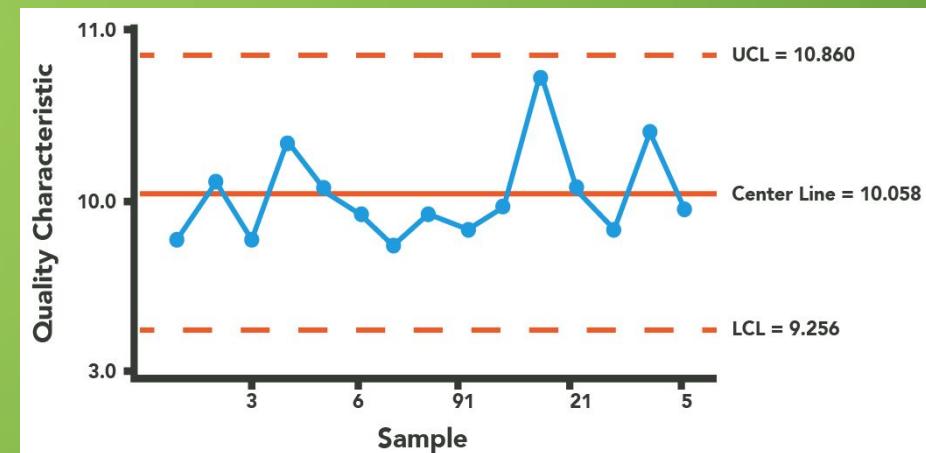
MONITORING AND CONTROL

- Quality (Performance and scope)
 - Setting standards
 - Configuration management
 - Testing & Validation
- Schedule
 - Critical Path
- Cost
- How?
 - Formative evaluation
 - Project Reports
 - Project Review Meetings



QUALITY CONTROL

- Quality Control Standards
 - Conforms to ISO 9001 (Documentation)
 - National Electrical Code (Systems)
 - Industrial Building Codes (Floor)
 - Power Floors Quality Standards (QS-1000)
 - All Work Instructions reference QS-1000
- Change Control
 - QS-1000-21 (Engineering Change Order)
- Defect Reporting
 - QS-1000-31 (Defect Report)
- Manufacturing
 - Defect Database, Daily Status meetings
 - In-process Testing, Final Testing
- Environmental Testing
 - Vibration, Shock, Temperature
 - Water-Proof
- Installation
 - Each Tiles tested after installation (Handheld Meter)
 - Software (Monitoring Each Tile during Installation)



Competition



- Setup by Elizabeth Redmond in 2008
 - Headquartered at Michigan
 - Produces tiles that harnesses the energy in human footsteps to illuminate the floor.
 - Captures the vibration from movement and convert it into a burst of LED light which is expressed into the surface of the tiles.
- Different target audience



- Found in 2009 by Laurence Kemball Cook
- Headquartered in London
- Produces electricity by stepping on tiles that have electromagnetic induction through copper coils and magnets
- Criticized for their attempt in comparing their tiles with alternative energy generation sources

HELPING THE ENVIRONMENT



CONCLUSION

- Reduce strain on the energy grid
- All future buildings should be as environmentally friendly as possible
- Every little bit helps
- Many small things add up to a big thing!
- Technology will improve in the future
 - Tiles will become more efficient



QUESTIONS?

