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FABRICATION OF HUMAN FOOTSTEPS POWER GENERATION

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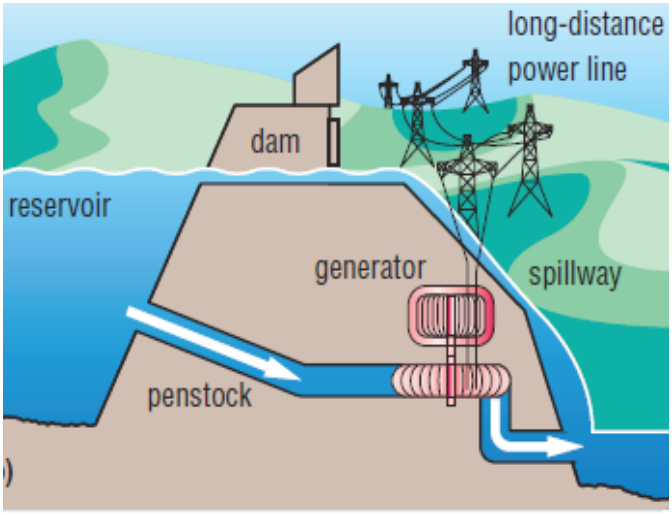
In this project we are generating electrical power as non-conventional method by simply walking or running on the foot step. Non-conventional energy system is very essential at this time to our nation.

Non-conventional energy using foot step is converting mechanical energy.

This project using simple drive mechanism such as spring and wooden pieces assembly. For this project the conversion of the force energy in to electrical energy. The control mechanism carries the springs, wooden boards, Fan, D.C generator, battery. The D.C generator used in this project is Permanente Magnet D.C generator. The Output of the generator is 12 Volts. This 12 Volt is stored in a Battery. The battery type is Lead-Acid battery.

The 3D models are designed in Pro/Engineer. Structural analysis is done on the assembly of wooden blocks and springs by applying load of 100kgs to validate the strength.



Cross-section of a hydroelectric power plant

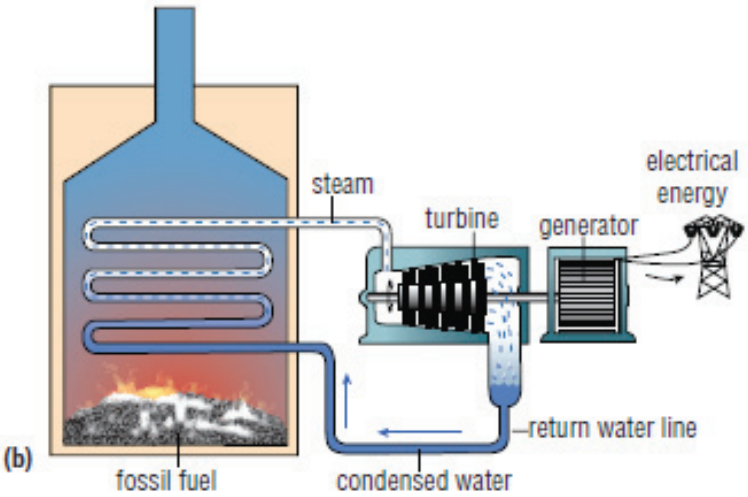


Figure 4 (a) The Lambton coal-fired thermal-electric generating station near Sarnia, Ontario (b) Cross-section of a coal-fired thermal-electric generating station

THERMAL-ELECTRIC ENERGY AND FOSSIL FUELS

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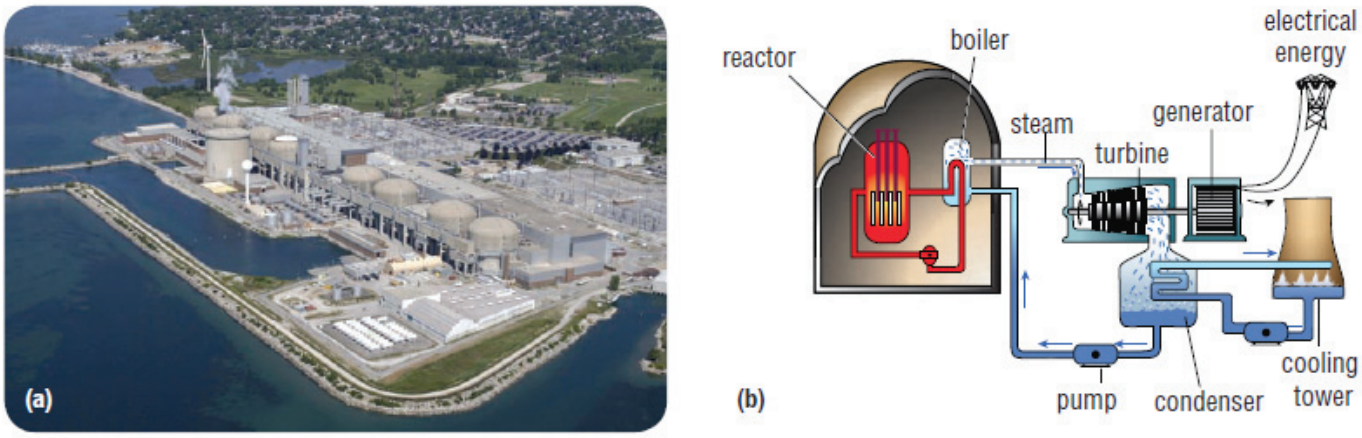


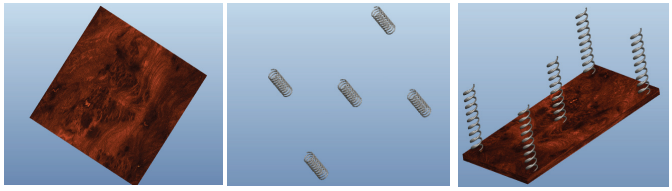
Figure 3 Nuclear power accounts for approximately 52 % of Ontario's electrical energy supply. (a) A nuclear power plant in Pickering, Ontario (b) Cross-section of a nuclear power plant

NUCLEAR ENERGY

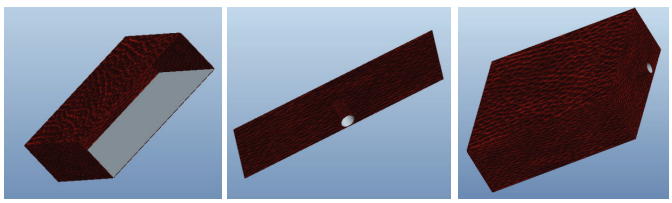
PROJECT DESCRIPTION

The main modules are:1)**Part Design2)Assembly3) Drawing5)Sheet Metal**

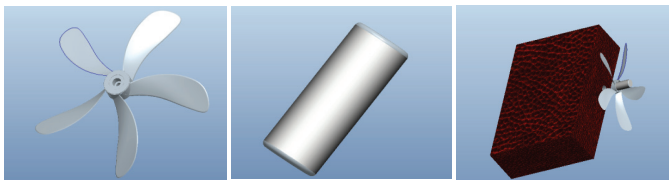
MODELS OF EQUIPMENT FOR GENERATING POWER USING FOOT STEP



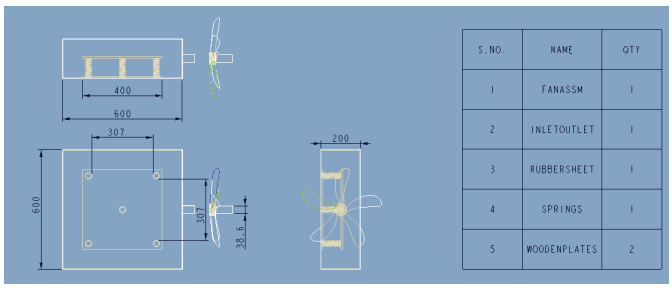
BASE PART – WOODEN BLOCK SPRINGS

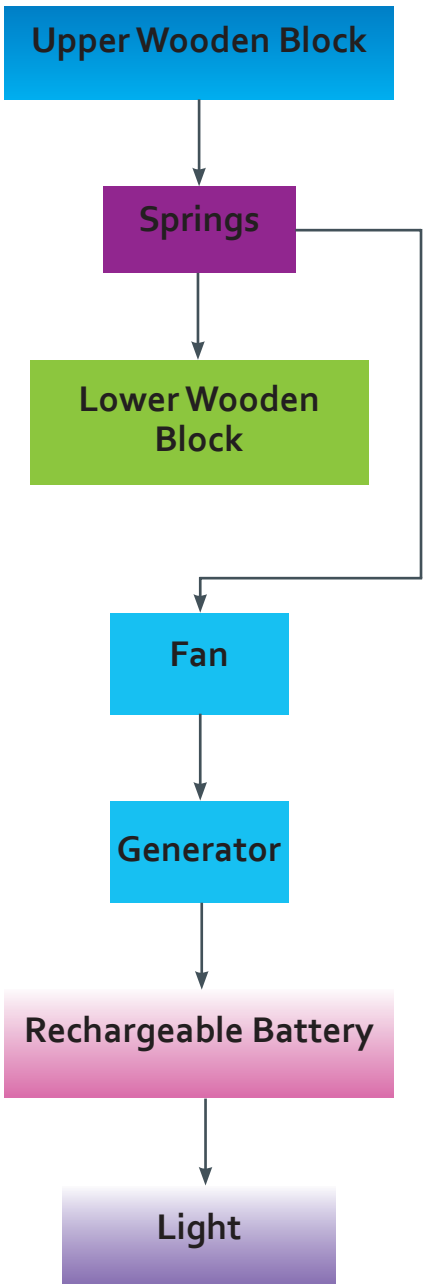


RUBBER SHEET OUTLET PIPE Final Assembly Part



Fan Shaft Final Assembly Part





PRINCIPLE

This setup works on the principle of converting the linear motion due to pressure of foot steps into rotary motion. This rotary motion is utilized to rotate a power generating device (generator). The power generated is stored using dry battery. The amount of rotation depends upon the weight of the person walking over the platform and the tension of the spring used. Depending upon the power generator used, the power output can be increased.

COMPONETS USED

WOODEN BLOCKS

SPRINGS

RUBBER SHEET

12V GENERATOR

FAN

BATTERY

LED LIGHTS

STRUCTURAL ANALYSIS ON ASSEMBLY OF WOODEN BLOCK AND SPRINGS BY APPLYING LOAD OF 100Kgs

Simulation of assembly

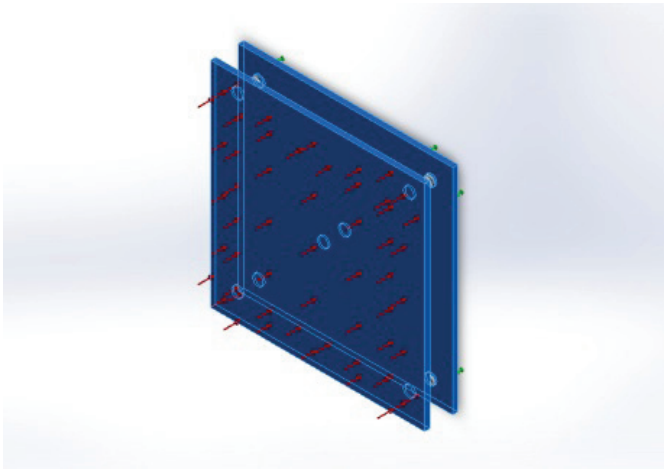
Date: Tuesday, April 01, 2014

Designer: Solidworks

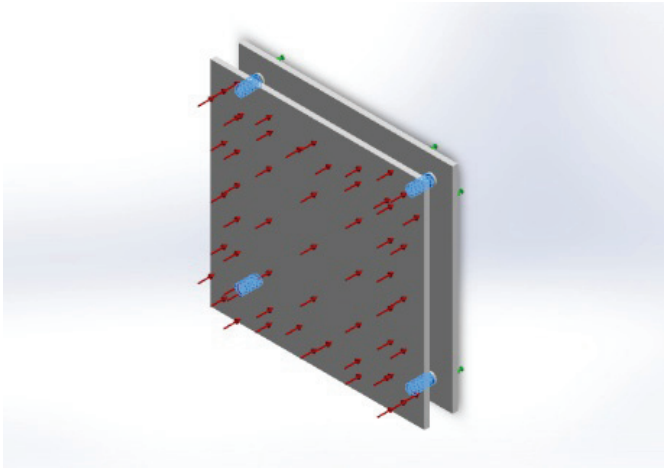
Study name: Study 1

Analysis type: Static

Material Properties



Name:	Default
Model type:	Linear Elastic Isotropic
Default failure criterion:	Max von Mises Stress
Yield strength:	3e+007 N/m^2
Tensile strength:	3e+007 N/m^2
Elastic modulus:	3e+009 N/m^2
Poisson's ratio:	0.264
Mass density:	159.9 kg/m^3
Shear modulus:	3.189e+008 N/m^2



Name:	spring steel
Model type:	Linear Elastic Isotropic
Default failure criterion:	Max von Mises Stress
Yield strength:	6.2e+008 N/m^2
Tensile strength:	3e+007 N/m^2
Elastic modulus:	2.1e+011 N/m^2
Poisson's ratio:	0.313
Mass density:	7850 kg/m^3
Shear modulus:	3.189e+008 N/m^2

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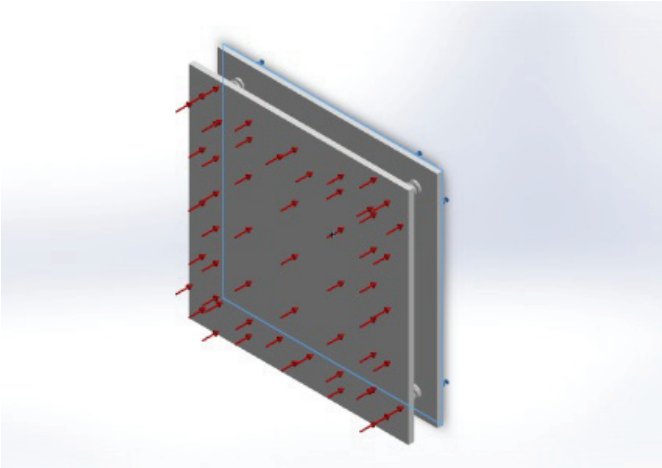
Loads and Fixtures

Fixture name : Fixed-1



Fixture Details

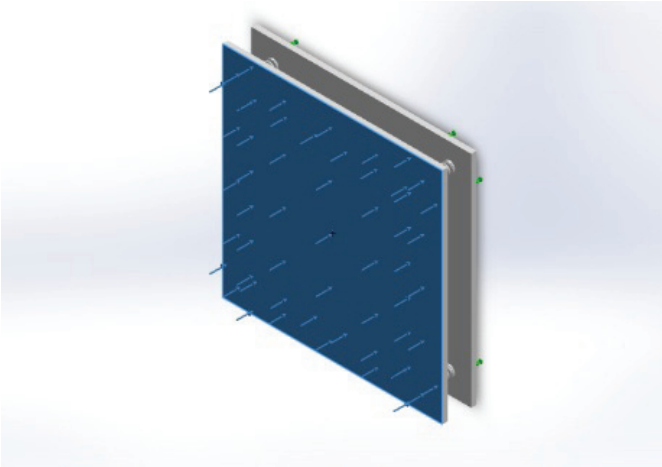
Entities: 1 face(s)

Type: Fixed Geometry

Resultant Forces

Components	X	Y	Z	Resultant
Reaction force(N)	0.000706279	0.00135671	99.9793	99.9793
Reaction Moment(N-m)	0	0	0	0

Load name : Pressure-1



Load Details

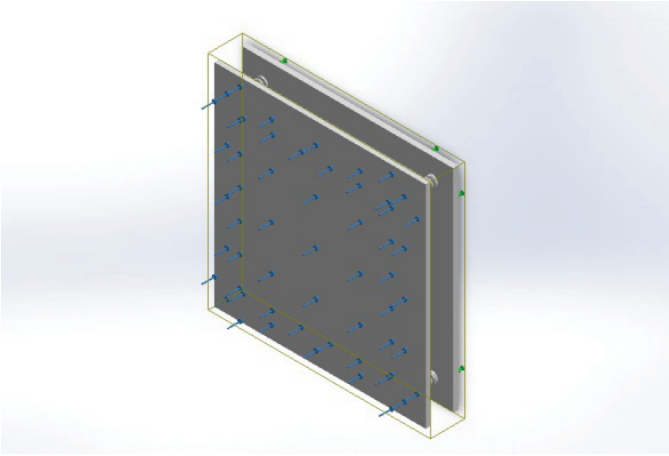
Entities: 1 face(s)

Type: Normal to selected face

Value: 0.0002687

Units: N/mm^2 (MPa)

Contact Information



Contact : Global Contact

Contact Properties

Type: Bonded

Components: 1 component(s)

Options: Compatible mesh

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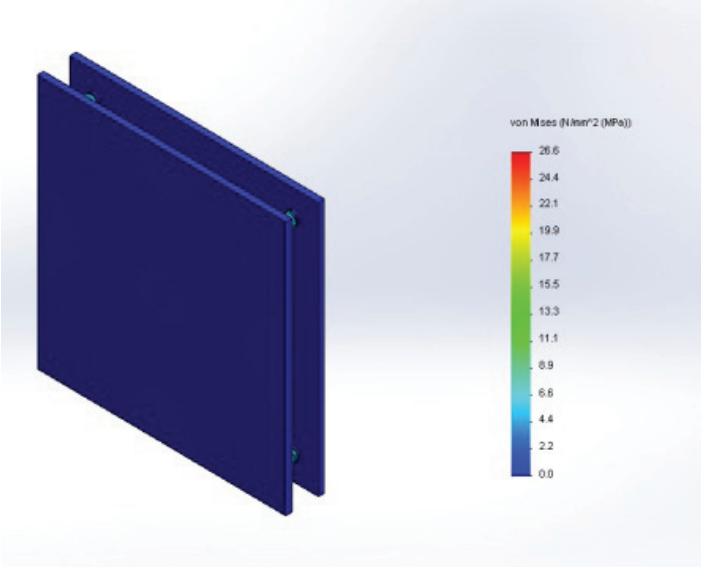
Study Results



new-igs-asm-Study 1-Stress-Stress1

Name : Stress1

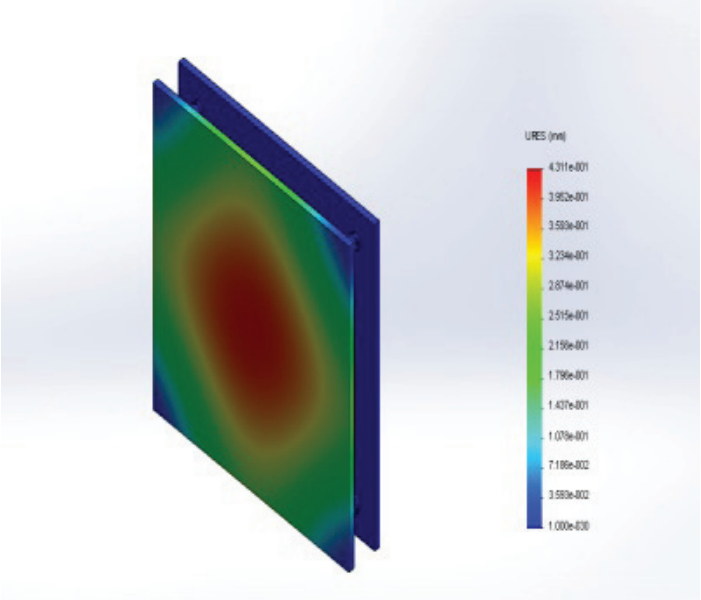
Type : VON: von Mises Stress

Min : 1.48995e-013 N/mm^2 (MPa)

Node: 756066

Max : 26.5767 N/mm^2 (MPa)

Node: 881204



new-igs-asm-Study 1-Displacement-Displacement1

Name : Displacement1

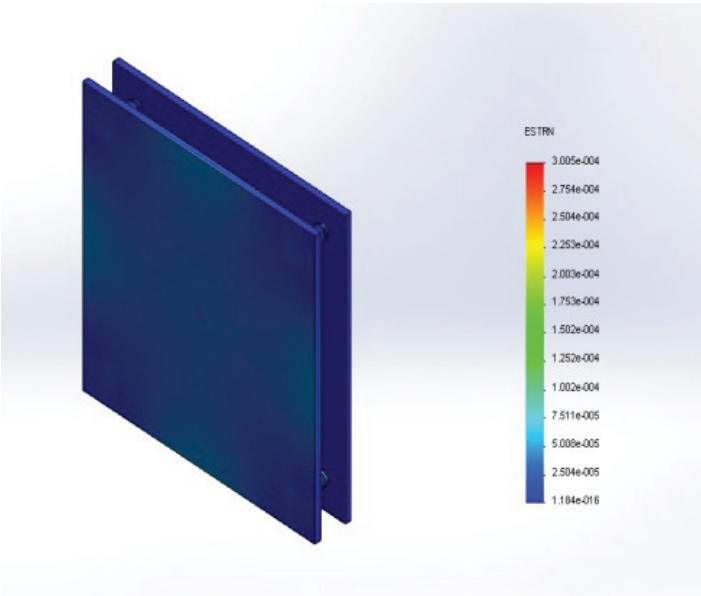
Type : URES: Resultant Displacement

Min : 0 mm

Node: 436083

Max : 0.431142 mm

Node: 32643



new-igs-asm-Study 1-Strain-Strain1

Name : Strain1

Type : ESTRN: Equivalent Strain

Min : 1.18354e-016

Element: 46730

Max : 0.000300456

Element: 298580

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FABRICATED MODELS

CONCLUSION

In this project we are generating electrical power as non-conventional method by simply walking or running on the foot step.

In this project we have designed an equipment set up using simple drive mechanism such as spring and wooden pieces assembly. The control mechanism carries the springs, wooden boards, Fan, D.C generator, battery and inverter control. The D.C generator used in this project is Permanente Magnet D.C generator. The Output of the generator is 12 Volts. This 12 Volt is stored in a Battery. The battery type is Lead-Acid battery.

The 3D models are designed in Pro/Engineer.

Structural analysis is done on the assembly of wooden blocks and springs by applying load of 100kgs to validate the strength. The material considered for spring is spring steel and for the blocks is wood.

By observing the analysis results, the stress value is less than that of the yield strength of both materials. So our design is safe under given load conditions.

We have fabricated the equipment, assembled and tested. We have successfully able to produce power to lighten up 2 LED lights.