

MEEN 3210 - MECHANISM DESIGN

PROJECT #1

FALL 2016

DUE DATE: October 12, 2016

1. Design a mechanism to provide orientation to a solar collector towards the sun during the day.

Initial Specifications:

- (a) Dimensions of the solar collector 2 m x 1 m x 0.15 m.
- (b) Weight of the solar collector = 400 N.
- (c) Constant angle of longitudinal axis, the axis of rotation, in respect to the horizontal plane adjustable between 30° and 50° .
- (d) Electric motor 120/230 V, 60 Hz.
- (e) Must comply with applicable safety and industry standards
- (f) Must have flexible connections to (stationary) water storage tank.

2. Design a mechanism to handle brick transport.

A mechanism to pick up bricks from a moving transport belt and deposit them onto another one moving at 90° angle. Both belts are horizontal and the transport one pair of bricks per second.

Initial Specifications:

- (a) Belt speed = 0.5 m/sec.
- (b) Belt width = 0.4 m.
- (c) Brick dimensions = 20 x 10 x 5 cm.
- (d) Brick mass = 2.5 kg.
- (e) Maximum acceleration on the brick = 2g.
- (f) Bricks are oriented with their longitudinal axis perpendicular with the direction of motion and they lie flat on the belt in pairs with distance between bricks 20 cm in the direction of motion and 10 cm along the longitudinal axis of the bricks.
- (g) Vertical distance between the two belts = 1 m.

3. Design a mechanism to transfer a 100 kg paraplegic patients safely from bed to wheelchair and vice versa.

Initial Specifications:

- (a) The patient has good upper body strength but no control of the lower extremities.
- (b) Your design should be operable by the patient with minimal assistance.
- (c) Safety is a paramount concern.

4. The local amusement park's business is suffering as a result of the proliferation of computer game parlors. They need a new and more exciting ride which will attract new customers. The only constraints are that it must be safe, provide