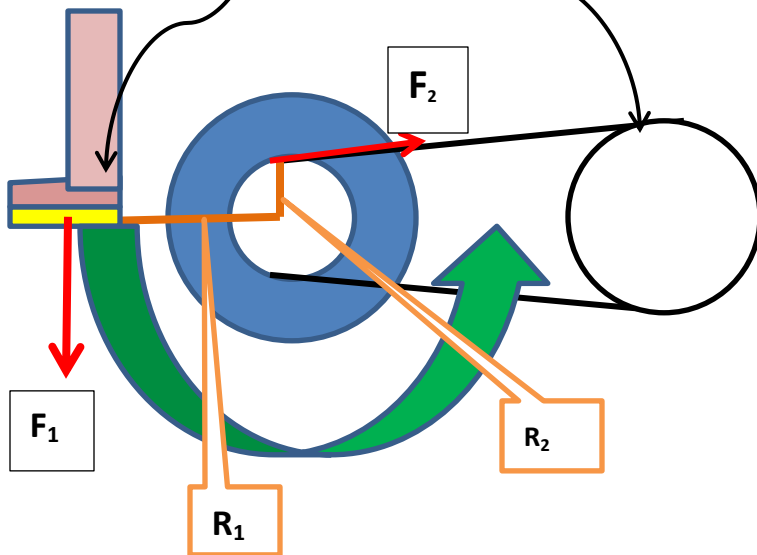# ROTATIONAL DYNAMICS

Unit 16 Dr John P. Cise, Professor of Physics, Austin Community College, 1212 Rio Grande St., Austin Tx. 78701 jpcise@austincc.edu & NYTimes July 10,2011 by Bruce Weber

EXPLORER

Crossing the Nation on 2 Wheels — Again

INTRODUCTION: This biker does input work W_{in} = (torque input)x(theta) = $F_1 R_1$ x (theta). Theta = angular displacement in Radians. The work output W_{out} = (torque output)x(theta) = $F_2 R_2$ x (theta).
Assuming 100 % efficiency $W_{in} = W_{out}$ ……. thus $F_1 R_1 x(theta) = F_2 R_2 x(theta)$

QUESTIONS: (a) If F_1 = 50 lb, R_1 = 1 foot, R_2 = 3 inches , Find F_2 ?

(b) Find the W_{input} when the peddler of bike makes a quarter revolution?

(c) What is the output work done by F_2 when the bike peddler makes a quarter revolution?

SHOW ALL CALCULATION

ANSWERS:
   (a)   200 lb
   (b)   25 π ft lb
   (c)   25 π ft lb

Bruce Weber, a New York Times reporter, tests his custom bicycle, which he had built for his trip across the country. He expects to be home in three months.
LIKE you, I'm getting old. It's harder to remember things, especially good things, the things I want to remember. Not so much because my mind is diminishing (hold the jokes, O.K.?), but because they happened longer ago than they ever did before. Days seem more alike than they used to, probably because the ever-mounting total of them makes it really hard to keep them distinct. This happens to everyone, I know, but I think it's worse for people who work at a newspaper, where the sum of our efforts each day greets us the next with the date stamped across the top of every page. Tick, tick, steady as a metronome: July, August, September … 2009, 2010, 2011. … Egad. How long can this go on? This week is my 25th anniversary at The New York Times. As it happens, for the last three years I've been writing obituaries! Every day, thinking about — well, you know. Here's what I'm doing about it. Eighteen years ago this summer I rode a bicycle, solo, across the United States and wrote about it. Starting next weekend, after flying from New York to Portland, Ore., I'll be trying to do it again. I say "trying." This is not modesty so much as caution, certainly a function of being 57 and not 39, the age I was when I embarked the last time, with no concept of the length and arduousness of what lay in front of me. Every challenge — the Rockies, for example, or the shadeless, sun-baked plains of South Dakota — was essentially a surprise. And perseverance is, after all, easier for the poorly informed. This time I know exactly how hard I'm going to be working. I'm nervous.