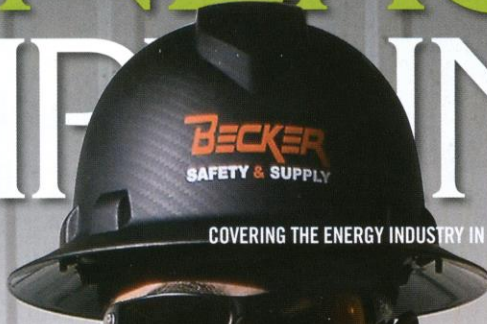




ENERGY PIPELINE

COVERING THE ENERGY INDUSTRY IN THE ROCKY MOUNTAIN REGION



NEW SAFETYWEAR

Gear that not only gets the job done, but makes it at least a little more comfortable

DRIVER SHORTAGE

Recent upticks in development come with a new demand for drivers

MEET ANGIE BINDER

Executive Director of the Colorado Petroleum Association

Updates make monitoring flowlines more of a priority

SEQ 1886 S18 P1



PERMIT # 3280
DENVER, CO
PAID
US POSTAGE
PSRT STD

*****SCH 5-DIGIT 80127 FSSD
INDUSTRIAL WATER PERMITTING
10658 W DUMBARTON DR
LITTLETON CO 80127-7902



8 52667724351

TECH TALK

Self-charging Smart Boots have multiple applications in oil field

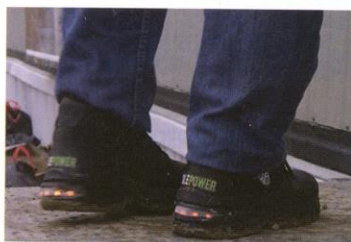
BY GARY BEERS • FOR ENERGY PIPELINE

For a class project in 2013, two mechanical engineering students at Carnegie Mellon University designed an insole (Figure 1) that creates electrical energy from each step and stores it for use in powering an LED in the back of the heel (Figure 2). Basically, thin and extremely small gear system that creates a mechanical dynamo in the heel of the sole insert, much like the cranks in novelty toys that created sparks when you ran the toy across the floor, or like those in a hand-cranked flashlight. The friction pressure of your body-step on the surface causes the dynamo to operate with each step creating electrical power.

LAUNCH OF THE FIRST INDUSTRIAL SMART BOOT

Soon, these college students realized that this self-charging footwear concept had many

applications in the field of charging portable electronics (Figure 3). In one of the earliest applications, they found that a two-and-half mile walk generates enough energy for a substantial smartphone recharge (SolePower charges smartphones by harnessing walking power. CNET.com, July 2013). Since then the insoles have been embedded with a variety of electronics, such as – motion sensors, GPS, wifi, RFID (radio frequency identification), lighting, and environmental sensors. As a result, this innovation in wearable technology will help solve safety, efficiency, and enhanced communication problems across many sectors (i.e., firefighting, construction, oil and gas, military, outdoor recreation/camping).



The college inventors required funding to launch their appropriately named business (SolePower) and sought start-up funding through Kickstarter. The U.S. Army provided a fortuitous opportunity by soliciting proposals for ways to reduce the weight of backup batteries (approximately 20 pounds) soldiers needed to carry during one-day missions in the field. SolePower responded, was successful, and the U.S. Army helped with funding and further testing of these smart boots ("This start-up is designing work boots that can charge devices and track a worker's every move." CNBC Newsletter, May 2017). National Foundation along with investors, such as Steve Case, soon added financial support to this start-up venture.

In early 2017, the inventors partnered with a major safety shoe company to further improve the design of the smart boot ("SolePower partners with SR Max, slip resistant footwear leader, to develop self-charging smart boots." Solepower.com, April 2017).

Figure 1 (left). Prototype of self-charging insole (Solepower, 2013)
Figure 2 (top). Boots with LEDs (Solepower, 2017)



For over 50 years **GARY BEERS** has worked in numerous fields of environmental science as a consultant, regulator and educator. This career included senior management position with major consulting, nonprofit and public organizations. He has founded several successful firms to capture emerging resource management markets. One of his latest ventures, EnviroScienceINFO, provides content for public media.

Photos for Energy Pipeline

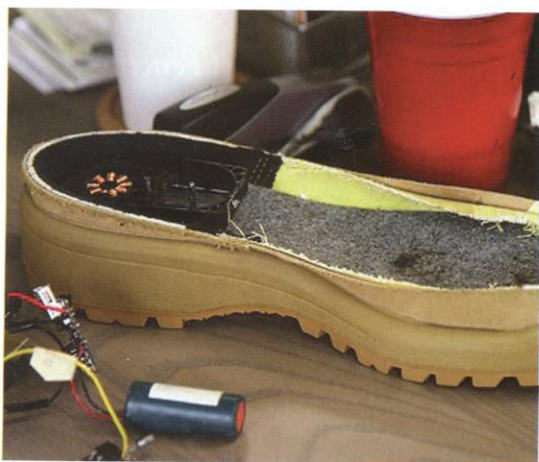


Figure 3. Smart Boot Features
(Solepower, 2017)



The basic smart boot is expected to cost between \$150 and \$175, excluding the cost of more specialized embedded electronics.

One of the inventors narrates a 19-minute YouTube video explaining the some of the details of the smart boot (https://www.youtube.com/watch?v=XK7uQ_0plw).

OIL AND GAS FIELD WORKERS

Oil field workers wearing the smart boot, and their office support, will have continuous actionable information on movement and location that will help the workers be safe, fit, in communication, and productive. Specific benefits of this wearable technology include:

- » continuous location of

worker in the event of an emergency while in a remote location.

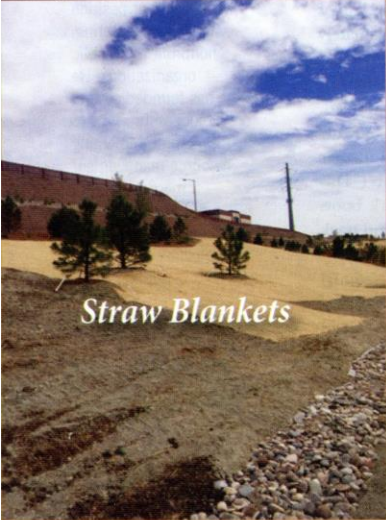
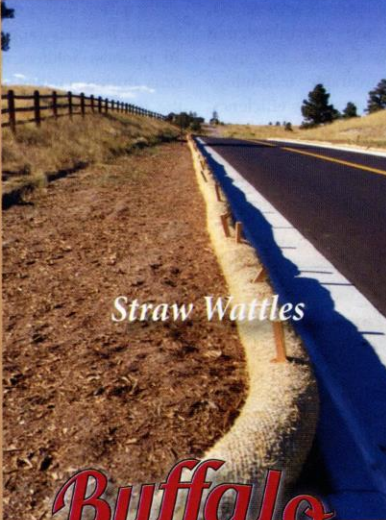
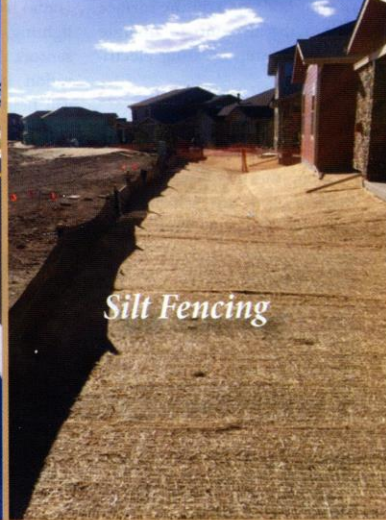
- » monitoring of ambient conditions (i.e., temperature, methane gas).
- » self-charging of worker's electronic devices (i.e., cell phone, headlamps, radio).
- » automatic alert to office support personnel if worker falls or is incapacitated.

KUDOS TO INVENTOR

The highlights of the recognition of this success story are worth noting.

Hahna Alexander is a co-inventor of the smart boot and has taken the spark of this ingenious idea into the reality of a business (STEMist Hahna Alexander is turning footsteps into power. Women in the World, February 2017). Her efforts have been recognized, for example:

- » 2014 Invention of the Year from Popular Science.
- » 2014 Invitation for Demonstration at the first White House Maker Faire.
- » 2014 Innovator of the Year Award from African Energy.
- » 2014 First Place in Steve Jobs' Rise-of-the-Rest contest (\$100,000 award).
- » 2017 Mother of Invention Award by Toyota Corporation.



Reclamation Products and Custom Seed Mixes

101 East 4th Street Rd. Greeley, CO 80631
 970.356.4710 Office 800.421.4234 Toll Free
www.buffalobrandseed.com

 Find us on: **facebook**



