

## Management Philosophy

OTEC's management philosophy is to contribute to realizing a healthy and energy-sustainable society through new types of human-powered vehicles with SDV technology.

## Company History and about SDV

OTEC, established in 1998 in Chiba, Japan, has been fully involved in the realization of a new type of human-powered vehicles named SDV with drives in which pedals move along oval tracks, collaborating with the National Institute of Advanced Industrial Science and Technology (AIST) since 2000. The features of SDV human powered-vehicles such as bicycles or recumbents are in the drives and in the geometrical arrangements of the power-related components of the vehicles. Briefly speaking, the design principle of SDV is as follows:

**The direction of the motion of a pedal in its power phase is designed to coincide with the direction in which the rider can most easily apply force on the pedal while stretching his or her legs.**

This simply follows Newton's Second Law and improves energy conversion efficiency from the rider to the vehicle, which is absolutely different in principle from systems that work in accordance with "the Principle of Leverage" such as "Oval Gear" and "Variable Length Crank".

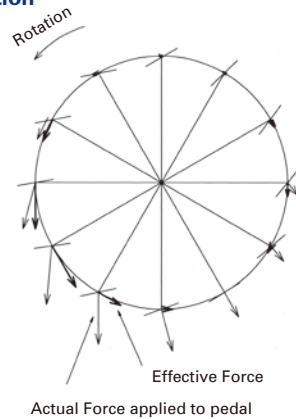
## Company Outline

Date of foundation	: April 24, 1998
Capital	: ¥ 3,000,000
Major products	: SDV bicycles (Alpha, Beta types) SDV recumbents (Windrider) Drive kits for recumbent
President	: Noriyuki Oda
Person in charge	: Noriyuki Oda
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Fax	: +81-43-250-0271
E-mail	: infosdvotec@krf.biglobe.ne.jp
URL	: <a href="http://www.bike-sdv.com/">http://www.bike-sdv.com/</a> (English is available)

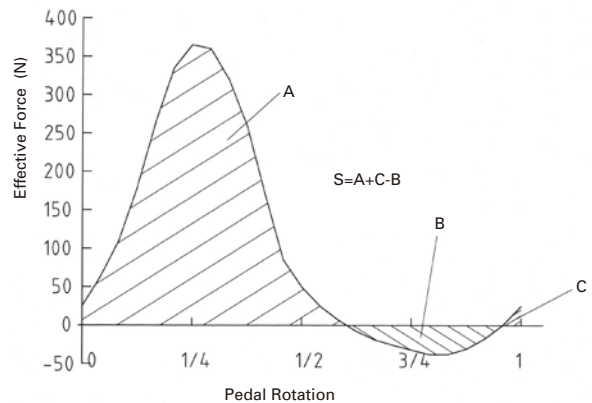
## Difference between conventional pedal drive and SDV pedal drive

1) Conventional: Pedal motion is circular, though the direction of the applied force on the pedal in the power phase is almost downward.

### Circular pedal motion



### Effective force pattern of conventional bikes

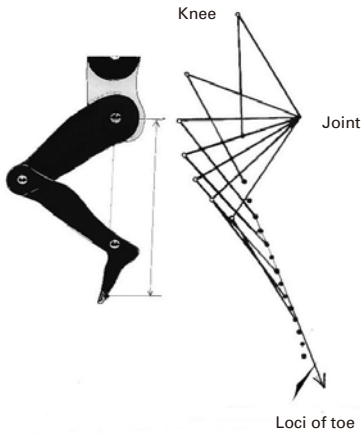


### Drive kit for recumbent

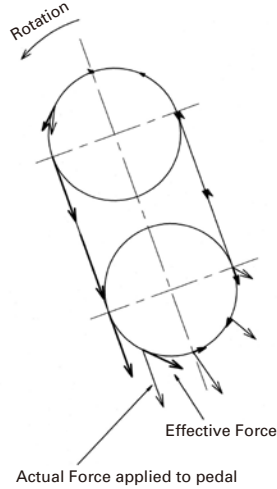


2) SDV: Pedal moves along an oval track of chain which is wrapped around an idle and a drive sprocket. The direction of the motion of each pedal in its power phase is designed to coincide with the direction in which the rider can most easily apply force on the pedal while stretching his or her legs. The loci of toe is slightly S shaped rectilinear when stretching his or her legs with maximum force to a pedal according to the paper by Mr. Iwatsuki of AIST.

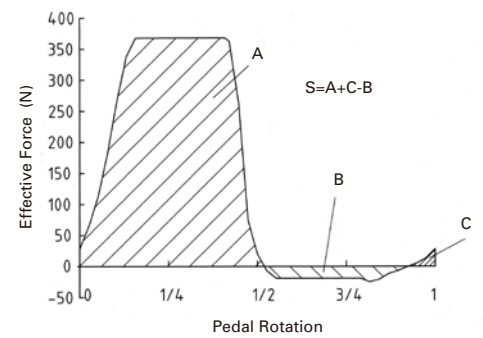
**Natural loci of toe**



**SDV pedal motion**



**Effective force pattern of SDV**



**Windrider**

Recumbent (Front wheel: 20", rear wheel:26")  
 Riders' height : 158 cm - 190 cm  
 Colors : User's request



**Alpha**

Road bike (27" wheel)  
 Alpha-medium; riders' height :160 cm - 175 cm  
 Alpha-large; riders' height :170 cm - 180 cm  
 Colors : red, sky blue, yellow, black, white



**Beta**

Easy riding bike (26" wheel)  
 Riders' height : 150 cm - 175 cm  
 Colors : red, sky blue, yellow, black, white

Refer to <http://www.bike-sdv.com/> for more information.