

# PRIME COMPOSITE PROSTHESIS: Lower Leg Prosthetic Device



## THE PROBLEM

The University of the East Ramon Magsaysay Memorial Medical Center - College of Allied Rehabilitation Sciences (UERMMMC-CAReS), estimates that around 80% of Filipino amputees do not have prosthesis. This is mainly because the cost of getting a prosthetic device including the medical services that come with it are expensive. High-quality prosthetic devices made of gold standard materials (carbon fiber and titanium alloy) are durable but are expensive and heavy. Cheaper prosthetic devices are light-weight but are generally weak and offer very short service life. There is therefore a need for prosthetic devices that are durable and light, but affordable.

## THE SOLUTION

To address this problem, Engr. Eduardo Magdaluyo, Jr. and his team of researchers from the University of the Philippines Diliman - Department of Mining, Metallurgical and Materials Engineering (UPD-DMMME) has successfully fabricated a lower leg prosthetic device that utilizes natural fibers in its composites. Initial results of their structural strength simulation studies show that their design is an affordable yet promising alternative to gold standard prostheses. Maximum tensile strength of their fabricated socket is comparable with that of a carbon fiber reinforced composite, and the maximum yield strength of their fabricated pylon ranks second to titanium alloy. Five prototypes have now been fabricated. In partnership with Dr. Emmanuel P. Estrella of the University of the Philippines-Philippine General Hospital (UP-PGH) Department of Orthopedics, these will be subjected to different tests at the UP-PGH Gait Laboratory, to determine its performance when used by an actual patient.

With the incorporation of natural fibers, these fabricated prosthetic legs are more affordable and more light-weight but are as durable as other high-end prosthetic legs in the market. With this device, the proponents are expecting that more Filipino amputees can avail prosthetic devices through PhilHealth's expanded Z Benefit Rate for Mobility, Orthosis, Rehabilitation, Prosthesis Help (ZMORPH) package.



## TECHNOLOGY GENERATOR

University of the Philippines Diliman  
Project leader: Engr. Eduardo R. Magdaluyo, Jr.

## TECHNOLOGY DEVELOPMENT

The product is currently at Technology Readiness Level (TRL) 4. The proponents are still in the process of producing prototypes for laboratory studies.

*Interested technology adopters may send a letter of intent addressed to:*



**Dr. Lourdes Marie S. Tejero**  
Director, UP Manila-Technology Transfer and Business Development Office  
[upm-ttbdo@up.edu.ph](mailto:upm-ttbdo@up.edu.ph)