（Form6）

論　文　要　旨
Thesis Abstract

※報告番号	乙 第　　８４号	氏　名 (Name)	TRAN VAN THUC

主論文題名　（Title)

　　Development of Body Weight Support System for Gait Training: Design and Evaluation of the Novel Body Weight Support System Using Pneumatic Muscle Actuators.

内容の要旨　（Abstract)

　　This research thesis introduces the development of Treadmill Body weight support using pneumatic actuator for gait training system. The whole gait training system is so called AIRGAIT system which is for lower limb training for disability patients such as stroke and spinal cord injury (SCI) patients. The main scope of this research is to give a new designing, validating and assessment for active Body Weight support system to reproduce, in the best way, the behavior of the normal walk. Based on the assessments and its evaluations, the novel Treadmill Body Weight support system using pneumatic muscle actuators shows its characteristics of this system are simplicity, low cost, flexibly maintaining the constant unloading force and easiness for controlling the supported force. Especially, the capability of the novel Treadmill Body Weight support system is to generate the unloading forces that track the Center of Pressure (COP) since it switches from left to right and vice versa. Author implemented and compared two different systems, a classic one and new one based on the utilization of PAMs. In the new active BWS system, i.e. introduced new way so that author used the projection along the x-axis (lateral) of the subject COP as an input in order to give

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to the patient the freedom from oscillate as during a normal walk. To show the goodness of my proposed active system, several experiments were conducted. For these experiments, author recorded the COP paths of the subject in the implemented systems, the ground reaction force and unloading force of each system for comparison. For stronger system assessment, the Mac3D motion capture system was used for measurements. The Center of Mass and gait parameters for each trial then was calculated to see the effect of each system to the subject. The COP results show that the active Treadmill Body Weight Support system was the better in reproducing the behavior of normal walking. The same results could be seen from the reaction forces, unloading forces and Center of Mass information. Moreover, the advantage of the new system could easily archive the desired unloading force or reaction force while for the classic one in some case couldn't.