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Numerical Analysis Dynamometer (Water Brake) Using Computational Fluid Dynamic Software

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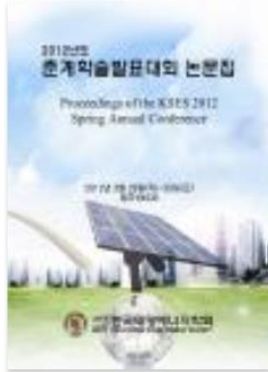
One of the most popular internal combustion engines is the engine in the transportation device. Power is a parameter that shows the capabilities of an object that gives energy, for example the internal combustion engine. Power in this engine is measured by a device called dynamometer. The CFD (Computational Fluid Dynamic) fluent software was simulated several impeller variables to absorb power of engine. With that result, we knew the biggest dynamometer absorber power, cheapest and easy to be made. The hydraulic ...

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태양열 화학반응기의 수소전환효율 예측 시뮬레이션

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Simulation of the Hydrogen Conversion Rate Prediction for a Solar Chemical Reactor

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Abstract

Steam reforming of methane is the most wide spread method for hydrogen production. It has been studied more than 60 years. methane reforming has advantages in technological maturity and economical production cost. Using a high-temperature solar thermal energy is an advanced technology in Steam reforming process. The synthesis gas, the product of the reforming process, can be applied directly for a combined cycle or separated for a hydrogen.

In this paper, hydrogen conversion rate of a solar chemical reactor is calculated using commercial CFD program. 2 models are considered. Model-1 is original model which is designed from the former researches. And model-2 is ring-disk set of baffle is inserted to enhance the performance. The solar chemical reactor has 3 inlet nozzle at the bottom of the side wall near quartz glass and an exit is located at the top. Methane and steam is premixed with 50:50 mole fraction and goes into the inside. Passing through the porous media, the reactants are converted into hydrogen and carbon monoxide.

Keywords : 메탄가스 수증기 개질(Methane steam reforming), 고온 태양열(High-temperature solar thermal), 접시형 집열기(Dish type solar concentrator), 전산유체역학(CFD)

기 호 설 명

G	: 건구온도 ($^{\circ}\text{C}$)
G_{irr}	: 습구온도 ($^{\circ}\text{C}$)
A_{mirror}	: 직전 건구온도 ($^{\circ}\text{C}$)
T_{mirror}	: 건구온도 절대값 ($^{\circ}\text{C}$)

Numerical Analysis Dynamometer (Water Brake) Using Computational Fluid Dynamic Software

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Abstract

One of the most popular internal combustion engines is the engine in the transportation device. Power is a parameter that shows the capabilities of an object that gives energy, for example the internal combustion engine. Power in this engine is measured by a device called dynamometer. The CFD (Computational Fluid Dynamic) fluent software was simulated several impeller variables to absorb power of engine. With that result, we knew the biggest dynamometer absorber power, cheapest and easy to be made. The hydraulic dynamometer is selected type of dynamometer as the result of design process. The basic principle of a hydraulic dynamometer is the same as centrifugal pump but it has low pump efficiency. The results of the test are maximum power and torque of the tested engine and the operation area of the selected hydraulic dynamometer.

Key words: hydraulic dynamometer, impeller, CFD Fluent, power and torque.

1. Introduction

Combustion engine is one of heat engine type which applied in many sectors (transportation, industry, power station, etc). Combustion engine power is important to be known to measure working performance of engine.

Work performance of fuel combustion

engine is known using power measuring device. Power measuring device which the most applied and has popular in many market is dynamometer. Work principle of dynamometer is by giving resistance at rotation of crank shaft, torsion effect measured and power