LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	The Application of Coffee Grinding Machine to increase the Production Capacity of Temanggung Coffee		
Jumlah Penulis	:	5 orang (Vivi Endar Herawati, Lintan Dian Saraswati, **M Arfan**, Gilar Pandu Annanto, Rahmat Mafuh Ihsan)		
Status Pengusul	:	penulis ke-3		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Journal IJETER (International Journal of Emerging Trends in Engineering Research)
		b. Nomor ISSN	:	2347 - 3983
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		g. Terindex	:	Scopus, Q3

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The Application of Coffee Grinding Machine to increase the Production Capacity of Temanggung Coffee

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ABSTRACT

Coffee (Coffea arabica) is a genus of flowering plants whose seeds, called coffee beans,are used to make coffee drink. it is a member of the Rubiaceae family. Coffee is an important commodity, especially for Indonesia, this is because coffee become one of biggest revenue for the country. One of the coffee production centres was in central java with temanggung become the most productive district in its. the production robusta coffee reach 30.27% and the arabica coffee reach 22.16%. Despite of it, the production capacity of in temanggung district is still lower that its potential. Based on the research, the production level of temanggung coffee can reach 1.3 ton of robusta coffee per hectar are and for the arabica coffee can reach 1.4 ton per hectar are. The reason of why the production level below its potential is because most of the people who work in the temanggung coffee industry are limited to the technology to increase the production level. One the problem that faced the farmer is the grinding process, the common grinding machine are able to grind 200 gr of coffee in one time and need to be rested for 5 minutes to grind another bean. Due to this problem, a customized grinding machine were applicated. The current machine can perform up to 52 kg per hour compared to the common machine that only can perform up to 5 kg per hour.

Key words : Coffea arabica, Coffea robusta, Grinding process, Important commodity, Productivity

1. INTRODUCTION

Coffee (Coffea arabica) is a genus of flowering plants whose seeds, called coffee beans, are used to make coffee drink. it is a member of the Rubiaceae family. They are evergreen shrubs or small trees that grow approximately 5 m (15 ft) tall when unpruned. Coffee trees are native to tropical Asia and Southern Africa. Coffee ranks as one of the world's most valuable and widely traded commodity crops and is an important export product of several countries [1]. The leaves are dark green and glossy, usually 10–15 cm (4–6 in) long and 6 cm (2.4 in) wide. The flowers are axillary, and clusters of fragrant white flowers bloom simultaneously and are followed by oval berries of about 1.5 cm (0.6 in). Green when immature, they ripen to yellow, then crimson, before turning black on drying. Each berry usually contains two seeds, but 5–10% of the berries have only one; these are called pea berries. Berries ripen in seven to nine months [2]. Coffea arabica is predominantly self-pollinating and as a result, the seedlings are generally uniform and vary little from their parents. In contrast, Coffea canephora, C. excelsa, and C. liberica are self-incompatible and require outcrossing. This means that useful forms and hybrids must be propagated vegetative. Cuttings, grafting, and budding are the usual methods of vegetative propagation. On the other hand, there is great scope for experimentation in search of potential new strains [3].

Coffee is an important commodity, especially for Indonesia, this is because coffee become one of biggest revenue for the country [4]. Based on the data from Agriculture ministry on 2015, export value of coffee reaches USD 45 million [5]. Because of this, coffee become an opportunity for more than 5 million people who work in this commodity [6]. Almost 70% of the coffee produced in Indonesia were exported to many countries and only 30% that consumed in Indonesia itself. In central java, the volume of coffee that going to export are reach more than 10 thousand ton and has value more than 9.5 million USD.

The center of coffee production in central java was located in Temanggung district, Semarang district, Kendal, Jepara and Wonosobo, Banjarnegara, Klaten, Pemalang, and many more. Table 1 show the percentage of the production in every district.

From the table 1, it can be seen that Temanggung become the most productive district in central java with the production robusta coffee reach 30.27% and the arabica coffee reach 22.16%. Despite of it, the production capacity of in

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An Effective Speed Control Strategy for Synchronous Generators of an Interconnected Hydropower System

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ABSTRACT
Load-frequency control problem of an interconnected hydropower system directly relates to the speed control of all synchronous generators in the network. The major goal of the speed control for such a case of complex power grids is to stabilize the rotational speed of the hydraulic turbines, thereby eliminating the fluctuations of both the system frequency and tie-line power flow resulting from random and continuous load changes. The final aim is to bring the network back to a stable state after load change appearances. This paper introduces an effective control scheme as an integration of the conventional PID regulators and the particle swarm optimization technique in dealing with this speed stabilization. Various simulation scenarios with different cases of load changes and fitness functions will be presented using MATLAB/Simulink package to demonstrate the applicability of the proposed control methodology over the traditional PID and fuzzy logic – based control counterparts.

Key words: interconnected hydropower system, speed control, PID, fuzzy logic controller, PSO-based PID.

1. INTRODUCTION

It is obvious that hydropower still plays a vital role in electricity market in a lot of countries at present. New modern hydropower utilities have been recently set up to enhance quality related to control, stability and distribution of the electricity. Advanced techniques such as modern control strategies and optimization methods have also been applied for designing numerous complex hydropower systems.

In power systems, including interconnected hydropower grids, loads depending upon customers usually vary over time. Load changes may appear randomly and continuously at anywhere, causing the net frequency fluctuation. It is obvious the system frequency is proportional to the speed of synchronous generators and tie-line power in an interconnected power system. Therefore, from this point of view, control of generator speed should be strictly considered in order to stabilize the system frequency and the tie-line power flow at scheduled values, thereby bringing the system back to the stability with acceptable technical performances [1-5].

To cope with the speed regulation problem, the supplementary control strategies have been taken into account to tackle the mismatch between load in each area and generation. Due to the interconnection between a number of generation substations, a tie-line bias control scheme has been widely used for the speed regulation or load-frequency control. Traditionally, the integral regulators with ability to eliminate the steady-state of the control system were used at first. However, with the increasing complexity and stringent demands of power systems in practice, the conventional regulators should be replaced with better speed controllers. Even the PID (proportional-integral-derivative) regulators might have been considered to be traditional controllers, they are completely able to deal with the speed stability of an interconnected power system. They are highly suitable for the hydropower systems which comprise of hydraulic turbines characterized by a specific parameter namely starting-up time of water. This time constant refers to the time calculated for a hydraulic turbine from the zero level of fluid column accelerated to rated discharge [1-2]. Since the conveyance system of a hydropower utility normally composes of major elements such as reservoir, control gate, intake, penstock, wheel case and draft tube, it is highly difficult to cope with the starting-up time of water when modelling and controlling the power system in designing the speed control strategy. The PID controller with the optimization of parameters is completely able to tackle the speed control problem of the interconnected hydropower system. This work is to propose a speed control strategy applying the modified PID controllers, in which the particle swarm optimization (PSO) algorithm considered to be one of the most successful optimization mechanisms is utilized to effectively determine three coefficients of the PID controller [6-15]. The applicability of the proposed control methodology will be testified and compared with the traditional PID regulator tuned by auto-tuning method existed in MATLAB/Simulink and the fuzzy logic controller studied in [5].

This paper will be organized as follows. Section 2 presents research background related to this work including the mathematical model of a typical two-area interconnected hydropower system, the traditional speed regulators and the PSO algorithm. Next, Section 3 introduces the proposed control strategy in association with the PSO algorithm. Section 4 then provides numerical simulation results implemented in MATLAB/Simulink environment to

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Properties of Hot Mix Asphalt Containing Reclaimed Asphalt Pavement of the Aleppo highways

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ABSTRACT

The post-war phase requires engineers to prioritize and submit strategic plans for rebuilding the infrastructure destroyed by the recent war in Aleppo city, which has become an imperative, not an option. Roads and streets were also exposed to sabotage, as well as the lack of maintenance operations for these roads. In order to avoid the depletion of natural aggregates (NA), this research focused on the possibility of utilizing reclaimed asphalt pavement (RAP) as a raw material in the production of asphalt mixtures with specifications that dictate those made from natural materials. Furthermore, the unexpected increase in destructive highways is one of the environmental problems facing civil engineers in the future. Several percentages of pure asphalt were added to the RAP mixtures, which are as follows: 2, 2.5, 3, 3, 3.5, 4, 4.5, 5, 5.5, and 6% by asphalt mixture, where the ratio of pure asphalt 3%. The plastic waste (PW) was added to the RAP samples with ratios of 0, 2.5, 5, and 10% by pure asphalt weight. PW additives were of two types: polyethylene terephthalate (PET) and Polyvinyl chloride (PVC). The dry and wet mixing methods were used to add the PW to the RAP mixes. The study concluded that the percentage of rap added to the HMA samples is 50%, and the ratio of rap is 7.5%, according to the wet method. And that there is an increase in stability up to 25% when adding PVC to rap mixtures according to the wet method The replacement proportions of **RAP** were 0%, 25%, 50%, 75%and 100 % by total weight of HMA. Other alternatives should be considered.

Key words*:* Hot Mix Asphalt, Natural Aggregate, Reclaimed asphalt pavement.

1. INTRODUCTION

Asphalt concrete (AC) can be considered as a complex mixture that comprise of three constituents: aggregate that represent the main part, asphalt as the binder and air voids. In general, HMA is mainly composed of approximately 95% aggregates (coarse, fine and filler) and 5% asphalt cement [16]. HMA is usually made of dense graded that characterize the upper layer of asphalt highway pavement [27]. The paved surfaces cover a wide area of urban areas, where paved surface with bitumen concrete or Portland concrete cement can include up to 45% of an urban area in the United States [19].

Approximately two billion tons of NA are consumed in construction process each year in the US, this consumption is predicted to growth up to 2.5 billion tons per year by the year 2020 [22], [9], The latest studies have been stated that demolished construction amounts in the European Union (EU) around 850 million tons per year, this denote approximately 31% of the global waste generation [20]. The EU, 500 kg of rubble, demolished construction waste each year relate to every citizen [23]. On the other hand, the ground excavation to extract the aggregates production will cause environmental damage (the change of landscape) [10], [5]. The major source of raw aggregates which are used in the creation process of recycled aggregates are demolition of houses, residential buildings, bridges, roads, dams, and sometimes even from a natural disasters [7], [6].

The considerable quantities of reclaimed asphalt pavement (RAP) are produced annually from existing road pavement because of maintenance need to mill. After crushing and sieving analysis, the RAP can be recycled in new asphalt mixtures, where exact amount of virgin aggregates and asphalt cement. RAP considered a good reused material from both environmental and economic viewpoints [24].

The quantity of RAP depends on the properties and homogeneity of the materials involved in HMA mixes [18]. Several studies have shown that the optimal use of RAP ranges between 15 to 40 % in the HMA mixture, as the small percentage of RAP does not affect the properties of the mixtures. As for the high levels of it, there are many harms due to the excessive hardening of the asphalt, which leads to the appearance of premature cracks of low temperature and fatigue in addition to the oxidation during the working life of the pavement. This hardening can be explained by reducing the ratio of Maltenes in relation to the increase in Asphaltenes in the resulting mixture [1].

According to investigate on asphalt plants, adding of 30% of RAP mixtures into the HMA mixtures keep approximately 33% of virgin asphalt, where if the asphalt percent of original HMA are 5%, it needs 3.5% of virgin asphalt of the total mixes weight [24]. The effort in heating/drying RAP is one of