



PT SEMEN PADANG

Increase fan pulley diameter to reduce fan speed instead of using dampers

SUMMARY OF THE OPTION

PT Semen Padang produces 5,240,000 tons of cement per year from its five plants, one of which is not functioning any more. The GERIAP project focused on Indarung IV.

Inspection of fans capacities and working loads showed that the fans at Indarung IV are too big. Dampers are used to reduce the airflow but this does not reduce electricity consumption. To improve energy efficiency of fans the diameters of the pulleys were increased. Investment costs were US\$ 28, annual savings are US\$ 2271 and the payback period is almost immediate. Electricity reductions are 39,912 kWh per year, which results in 29 tons CO₂ emission reductions per year.

KEYWORDS

Indonesia, Cement, Fans & Blowers, Dampers, Fan pulley

OBSERVATIONS

There are many fans used throughout Indarung IV for a variety of tasks within the cement making process. The size of the fans varies considerably from <5 kW up to >1500kW. Many of the fans used on site are controlled and monitored from the Central Control Room (CCR). Whilst looking at the controls for some of these fans, the Team observed that many of them have inlet guide vane (IGV) or damper controls that were closed to some extent and are not operating at best efficiencies because the open damper is only 13 % - 65 % in use. This shows fan capacity is too big.

OPTIONS

To increase the efficiency of electricity consumption, fan rotation is decreased by changing the diameter of motor pulley or fan pulley. Modified fan specifications are as follows:

- Fan name : Z3P56
- Motor: 3 phase; 45 kW; 1465 rpm

The field measurement results before and after the change of pulley are as follows:

	Motor			Fan	
	F Pulley (mm)	RPM	Ampere	F Pulley (mm)	RPM
Before modification	300	1465	42	200	2197
After modification	300	1465	29	234	1868

After the fan rotation is reduced, motor loading measurements were taken (electricity voltage 380 volt) and the motor load was found to decrease from 42 Ampere or 22.10 kW to 29 Ampere or 15.45 kW. Power saving is calculated from the difference in power needs before and after pulley change and was found to be 22.10 Watt – 15.45 Watt = 6.65 kW.

Financial benefits

- Investment: Rp. 250,000.-(US \$ 27.8 *)
- Annual cost savings: Rp.20,434,940.50/yr (US \$ 2,270.54/yr *)
- Payback period: immediate

Environmental benefits

- Annual electricity savings: 39,912 kWh (% energy saving from total energy consumption: 31%)
- Annual GHG emission reduction: 29 tons CO₂ (= 39,912 kWh/year x 0.000724 (conversion factor**))

(*)US \$ 1 = Rp 9,000

(**) www.uneptie.org/energy/tools/ghgin

FOR MORE INFORMATION

GERIAP National Focal Point for Indonesia

Dr. Ir. Tusy A. Adibroto Msc; or Ms. Widiatmini Sih Winanti

BPPT - Jl. MH Thamrin 8

BPPT II building 20th floor

Jakarta, Indonesia

Tel: + 62 21 316 9758/68

Fax:+ 62 21 316 9760

E-mail: tusyaa@ceo.bppt.go.id / widiatmini@yahoo.com

GERIAP Company in Indonesia

Ir Tresdi Arma

MM., Teguh Sutrisno

PT Semen Padang

Jl.Raya Indarung – Padang

West Sumatra

Tel: 62 (751) 322028

E-mail: tresdi@semenpadang.co.id; teguh@semenpadang.co.id

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