ABSTRACTS

Dipo Lokomotif Poncol is a part of PT KAI Daerah Operasi (Daop) IV Semarang that is specialized in managing of maintenance the locomotives it has. Nowadays, PT KAI Daop IV Semarang has three kinds of electric diesel locomotive and two kinds of hydraulic diesel locomotive. One of those locomotives is the newest edition that is called CC 203 locomotive. In this kind of locomotive, there are four systems applied, the air brake system, the diesel system, the electric system, and the mechanic system. And from those systems, will be chosen the most critical system based on Functional Hazard Assessment (FHA) method. And after operating that method, finally found the mechanic system as the most critical system. The mechanic system has 17 parts. Based on the total number of failure frequency, there are 6 critical parts gotten in the mechanic system. At last, the preventive maintenance of time interval will be set for each of critical parts.

As a transportation service company, PT KAI Daop IV has to implement the maintenance operation that is scheduled briefly. This maintenance is operated in order to give the customers' needs, especially in comfort guaranty, on time schedule, and also safety. In present, by Dipo Locomotive Poncol, PT KAI Daop IV Semarang has applied the preventive maintenance operation to the CC 203 locomotive. The preventive maintenance operation that has been done in Dipo Locomotive Poncol includes cleaning, inspection, and lubrication. Besides, the parts discard is done depends on the part's condition at that time, known from the inspection operation result. The preventive maintenance operation that has been implemented by Dipo Locomotive Poncol is a kind of maintenance based on the total number of kilometers of the locomotive. Instead, in setting the total number of kilometers, Dipo Locomotive Poncol ignores about the parts' life age. It makes a huge number of corrective maintenance, so it will also spend a huge maintenance cost.

The optimal preventive maintenance setting of time interval that is based on the parts' life age can minimize the maintenance cost and also can be a better alternative that could be done in maintenance policy applied by Dipo Locomotive Poncol. This setting of time interval is based on reliability, in order to describe the part's ability in doing its function during the operation period. This setting also uses the Reliability-Centered Maintenance (RCM) method and Minimizing Cost Maintenance model. Based on Reliability-Centered Maintenance (RCM) method, the maintenance policy can be set for the parts in mechanic system. And for the result, there will be 5 parts that use scheduled on condition task policy, 12 parts that use scheduled discard task policy, and 2 equipments that use scheduled discard policy too. For the 6 critical parts, they will use scheduled discard task. After deciding the maintenance policy for the 6 critical parts, then the time interval will be set as an optimum for the scheduled discard. This time interval optimizing use the minimizing maintenance cost model.

To compare the existing maintenance policy (scheduled on condition) and the alternative maintenance policy (scheduled discard) as a recommendation, this table below then made:

The comparison between the existing and the alternative based on Reliability :

Maintenance kind	Critical Parts	Tp (Hour)	*Reliability* (R(T))
Existing condition I (Inspection and discarding at the same time)	Rem Blok	340.92	0.216005281
	Bolt	340.92	0.304541392
	Roda Gigi Pinion	340.92	0.583515765
	Low Noise for Snubber	340.92	0.664511686
	Wickassy	340.92	0.838242588
	Axle Linning	340.92	0.739701852
Existing condition I (Inspection and discarding at the different time)	Remblok Inspection	340.92	0.216005281
	Bolt Inspection	340.92	0.304541392
	RG Pinion Inspection	340.92	0.583515765
	Low Noise FS Inspection	340.92	0.664511686
	Wickassy Inspection	340.92	0.838242588
	Axle Linning Inspection	340.92	0.739701852
	Remblok Discarding	404	0.101326335
	Bolt Discarding	400	0.127112245
	RG Pinion Discarding	391	0.273188876
	Low Noise FS Discarding	408	0.255166686
	Wickassy Discarding	510	0.314876712
	Axle Linning Discarding	532	0.208986083
Alternative condition	Rem Blok	100	0.91914
	Bolt	100	0.982813776
	Roda Gigi Pinion	200	0.98255
	Low Noise for Snubber	200	0.9887
	Wickassy	200	0.985456553
	Axle Linning	200	0.958990461

The comparison between the existing and the alternative based on Maintenance Cost :

Maintenance kind	Activity number	Total Cost
Existing condition I	17	Rp666,874,000.61
Existing condition II	97	Rp1,270,366,657.94
Alternative condition	60	Rp1,065,351,531.73

The system in existing condition I is the inspection and also the discard activity done in the same time. The system of existing condition II is inspection done first, then discard done in different time, depends on the result of inspection about parts' condition by operator. And the

system of the alternative condition is discard done based on time interval from the optimum result. Based on the maintenance cost, the system in existing condition I is the most efficient maintenance. But the reliability of this system is low, about 0.2 – 0.8. So, the alternative condition is the best maintenance policy for the 6 critical parts, because of the cost efficiency and also the reliability level, it is about 0.9.