

ABSTRACT

Final drive is the final drive of a hydraulic excavator, consisting of a set of planetary gears whose function is to receive hydraulic oil pressure and then convert it into motion and increase torque. One of the hydraulic excavator units belonging to CV Cahaya Indra Laksana experienced breakdown maintenance and final drive overhaul under a life time of 26,000 HM. The impact of damage to the planetary gear unit, which cannot be operated for traveling and total damage to the travel motor, research was conducted with the aim of analyzing the main factors causing planetary gear damage, finding the type of damage and providing maintenance recommendations. The research method uses qualitative methods by applying root cause analysis (RCA) to find the root of the problem. The data used is maintenance history data, spare part repair usage data for 2016-2020, and visual spare part damage data to find the type of failure. The results of the research analysis show that there are four main factors that cause planetary gear damage, namely human factors, methods, materials and the environment. From the macroscopic analysis of damage, the planetary gear experienced adhesive wear, abrasive wear, contact stress fatigue surface and fatigue fracture types of failure with the mechanism of fatigue formation being crack initiation, cracks propagation, ratchet marks, beach marks and final fracture. Preventive maintenance activities are needed to maintain and minimize damage to the planetary gear by carrying out periodic inspection and periodic service.

Key words: planetary gear, adhesive wear, maintenance.

INTISARI

Final drive adalah penggerak akhir *hydraulic excavator*, tersusun dari sekumpulan roda gigi *planetary gear set* yang berfungsi untuk menerima tekanan oli hidrolik kemudian merubahnya menjadi gerak dan meningkatkan torsi. Salah satu unit *hydraulic excavator* CV Cahaya Indra Laksana mengalami *breakdown maintenance* dan *overhaul final drive* dibawah *life time* 26.000 HM. Dampak dari kerusakan *planetary gear* unit tidak dapat dioperasikan untuk bergerak (*traveling*) dan kerusakan total *travel motor*, penelitian dilakukan dengan tujuan menganalisis faktor utama penyebab kerusakan *planetary gear*, menemukan jenis kerusakan, dan rekomendasi perawatan. Metode penelitian menggunakan metode kualitatif dengan menerapkan *root cause analysis* (RCA) untuk menemukan akar masalah. Data yang digunakan data *history maintenance*, data pemakaian perbaikan *spare part* tahun 2016-2020, dan data visual kerusakan *spare part* untuk menemukan jenis kegagalan. Hasil analisis penelitian menunjukkan terdapat empat faktor utama penyebab kerusakan *planetary gear* yaitu faktor manusia, metode, material dan lingkungan. Dari analisa makroskopik kerusakan, *planetary gear* mengalami jenis kegagalan *adhesive wear*, *abrasive wear*, *contact stress fatigue surface* dan *fatigue fracture* dengan mekanisme terbentuknya *fatigue* adanya *crack initiation*, *cracks propagation*, *ratchet mark*, *beach mark*, dan *final fracture*. Dibutuhkan kegiatan *preventive maintenance* untuk merawat dan meminimalkan kerusakan *planetary gear* dengan melakukan *periodic inspection* dan *periodic service*.

Kata kunci: *planetary gear*, *adhesive wear*, *maintenance*