

## Analisis kegagalan rear axle shaft truck kapasitas 7.5 ton = Failure analysis of rear axle shaft capacity 7.5 ton truck

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20296630&lokasi=lokal>

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### Abstrak

#### <b>ABSTRAK</b><br>

Dengan meningkatnya kenaikan produksi dalam suatu industri pada umumnya akan diikuti penurunan kualitas suatu produk dimana akan meningkatkan claim dari customer yaitu kegagalan mekanik pada rear axle shaft yang patah pada bagian flange. Untuk itu dilakukan pengujian agar diketahui akar penyebab kegagalan rear axle shaft truk model X dan memberikan solusi klaim patah. Pengujian yang dilakukan mencakup pengamatan fracture surface secara makroskopik dan mikroskopik, pengujian mekanikal properti seperti uji tarik, pengujian komposisi kimia, pengujian kekasaran permukaan, uji Vickers / uji kekerasan, dan perhitungan shear stress maximal. Dari pengamatan fracture surface tidak ditemukan crack awal yang menyebabkan kegagalan rear axle shaft, hasil untuk uji tarik material didapat sult 843 (N/mm<sup>2</sup>) syield 588 (N/mm<sup>2</sup>) e = 16.30%, untuk pengujian komposisi kimia bahan didapat hasil yaitu C (0.42-0.48), Si (0.15-0.35), S (0.03) max, P (0.03) max, Mn( 1.35-1.65), Ni( 0.25 max), Cr (0.35 max), Cu( 0.3 max), dari hasil perhitungan shear stress maximal memakai persamaan sehingga hasil yang didapat sult 42.15 N/m<sup>2</sup> pada Konsentrasi tegangan Kt 1,406 dan nilai Torsi, pada pengujian kekasaran permukaan hasil yang didapat semua ada dalam nilai standard yaitu 3.2 RZ, pada pengujian kekerasan didapat nilai kekerasan 610 HV dimana standard kekerasan adalah 620HV?800HV, Dari semua pengujian tidak ditemukan penyebab kegagalan pada rear axle shaft kecuali pada nilai kekerasan sehingga disimpulkan penyebab patah pada poros dikarenakan nilai kekerasan kurang sehingga dilakukan perubahan parameter untuk proses hardening

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#### <b>ABSTRACT</b><br>

<i>Increasing volume production in an industry in general will be followed by decline in quality product which enhance their customer's claim such a mechanical failure on Rear Axle shaft which fracture at the flange. The examination was done in order to know the root cause of the failure of the truck rear axle shafts X model and provide solutions fracture claims Tests performed include observation of fracture surface in macroscopic and microscopic, testing of mechanical properties such as tensile test, the testing of chemical composition, surface roughness testing, test Vickers / hardness test, and calculation of maximum shear stress. From the observation of fracture surface was not found crack that caused the initial failure of rear axle shafts, the result for material tensile test sult obtained 843 (N/mm<sup>2</sup>) syield 588 (N/mm<sup>2</sup>) e = 16:30%, for testing the chemical composition of the material we got the result that C ( 0:42 to 0:48), Si (0:15 to 0:35), S (0.03) max, P (0.03) max, Mn (1.35-1.65), Ni (0.25

max), Cr (0:35 max), Cu (0.3 max). Tests performed include testing fracture surface, which is done by macroscopic and microscopic, the result can not find crack test results early, mechanical property testing result obtained 843 (N/mm<sup>2</sup>) yield 588 (N/mm<sup>2</sup>)  $e = 16:30\%$ , testing the chemical composition of materials obtained results as the standard C (0:42 to 0:48), Si (0:15 to 0:35), S (0.03) max, P (0.03) max, Mn (1.35-1.65), Ni (0.25 max), Cr (0:35 max), Cu (0.3 max), the results of calculations based on the simulated shear stress values from the equation that is  $\sigma_{ult} = 42.15 \text{ N/mm}^2$  obtained maximal torque in the shaft, with a value of 1.406 Kt stress concentration results, value of hardness testing got result 610 HV hardness but the standard 620HV-800HV, thus found to be less than the standard. From testing concluded the cause of shaft fractures due to the lack of hardness, so that changes the process of hardening parameters.