

Analisis peningkatan temperatur pada drum brake akibat dinamika beban pada kendaraan tipe m1 = Analytic studies of load dynamic effect in drum brake temperature increment of m1 vehicle

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Abstrak

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Pengereman merupakan salah satu fungsi yang mempengaruhi faktor keselamatan dari kendaraan. Peninjauan sistem rem pada diperlukan untuk mengetahui kondisi yang terjadi pada rem ketika proses pengereman dilakukan. Salah satu indikator yang dapat ditinjau ketika proses pengereman terjadi ialah temperatur dari komponen pengereman. Penelitian ini dilakukan untuk mengetahui temperatur yang terjadi pada drum dari rem drum (tromol) ketika proses pengereman dilakukan. Pada penelitian ini dilakukan analisis temperatur drum yang terjadi dengan melakukan perhitungan analitik dan disimulasikan kondisi real dengan menggunakan software berbasis metode elemen hingga (finite element analysis). Adapun dari hasil perhitungan diperoleh temperatur rem jika diberikan pembebanan maksimal dan kecepatan maksimal akan mencapai temperatur sebesar 337oC berdasarkan analitik dan 356oC berdasarkan simulasi. Penambahan beban juga dilakukan untuk mengetahui kemampuan rem tromol dan didapat bahwa setelah penambahan 90% beban akan membuat rem bekerja pada temperatur di atas normal jika dioperasikan pada kecepatan 120 km/jam. Ketika pengereman dilakukan sebanyak 3 kali, temperatur rem akan melewati batas normal setelah penambahan 10% dari berat kosongnya.

ABSTRACT

Brake system is one of the most important factor to determine the safety of vehicle. Study of brake system is necessary to predict the condition of brake system when the braking process is happening. One of the indicator that we can predict is the temperature of the drum of the brake when it related to drum brake. This study aim to estimate the temperature of drum brake when the vehicle in braking process. This study using analytical method and numerical method using finite elemen method (FEM) software. To predict the temperature of drum, ANSYS Transient Thermal is used to simulate the distribution of the heat flux of the drum. The result of this study is show that in full laden vehicle when run and in maximum velocity of the vehicle, the drum will have temperature rises until 337oC according to analytic study and 356oC comparing to simulation. As related to increment of vehicle weight, this paper is calculate the temperature of the drum when the vehicle is given overload weight. The condition of vehicle is running in 120km/h with average deceleration of 6,5m/s². The increment until the vehicle have weight twice of its curbweight. The result of analytical study, the drum will have exceed the work temperature when its have 90% of curbweight added to its total weight in emergency stop condition. When the vehicle have repeated braking until 3 times of braking, the drum will have exceed the work temperature in 10% of curbweight added.

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