

Analisa internal cooling dies pada proses die casting = Internal cooling dies analysis transmission case die casting process

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Abstrak

Penggunaan aluminium sudah meluas hingga ke bidang otomotif, salah satu produknya adalah transmisi case pada kendaraan roda empat. Transmisi case ini dibuat melalui beberapa proses, pertama kali yaitu proses die casting, selanjutnya diproses machining, leaktest hingga ke assembling mesin kendaraan. Transmisi case ini tidak boleh bocor karena akan mengganggu fungsi roda gigi transmisi. Kebocoran pada transmisi case ini bisa terjadi karena defect casting, saat proses die casting terbentuk rongga dalam dinding part casting pada saat solidification. Rongga tersebut sering disebut sebagai shrinkage porosity. Shrinkage porosity merupakan masalah rumit pada proses die casting. Analisis yang dilakukan adalah mempelajari sejumlah informasi data pada proses die casting terutama yang berkaitan dengan pendingin cetakan (cooling dies), antara lain suhu permukaan dies, suhu cooling, tekanan dan debit cooling. Metode yang digunakan adalah pengamatan kebocoran pada part casting yang kemudian dilakukan pengambilan data data yang berhubungan dengan cooling dies. Setelah itu dilakukan perbaikan (improvement) pada proses casting maupun pada sistem cooling dies, dilakukan trial casting dan diamati hingga proses leaktest untuk mengetahui efektivitas improvement yang telah dilakukan. Improvement yang telah dilakukan antara lain, perubahan desain cooling flow menjadi cooling spot, pendinginan fluida cooling, pengantian pipa cooling dan perubahan debit dan tekanan cooling dies. Dari beberapa improvement yang dilakukan diperoleh bahwa perbaikan tersebut terbukti efektif menurunkan rejection kebocoran dari 5.11 % menjadi 0.97 %. Dengan demikian perbaikan ? perbaikan yang telah dilakukan dapat dijadikan pedoman atau referensi dalam mendesain cetakan maupun dalam pembuatan parameter cooling dalam proses die casting.

.....Aluminium usage were extend to automotive field, one of the product is case transmission on a car. Case transmission were made to pass of several process, the first process is die casting process, secondly machining continued by leak testing until it's assembled to a car engine. Leakage in case transmission is not allowed, because leakage will give bad effect to the function of gear's transmission. The oil lubricant in case transmission will go out from the transmission. Leakage can be caused by casting defect. When die casting process running specially when solidification time, blow hole occurred in wall part that called of ?shrinkage porosity?. Shrinkage porosity is the complicated problem at die casting process. Analyze were doing are study the several information data on die casting process, mainly that's relation with cooling die, for example cavity surface temperature, fluid cooling temperature, pressure and debit of cooling die. The first time is leakage analyzing on casting part and secondly calculating the cooling die system effect for defect casting part. The next step is to improve on casting process and die cooling system, the last step is doing the casting trial and analyze until leak test process for knowing the improvement result. The improvement were done are modified flow cooling to spot cooling, cooler the cooling fluid, changed the cooling pipe and adjusted the pressure and debit of die cooling. From the several improvement were done, these improvement were effective to reduce leakage from 5.11% until 0.97%. In the end, all improvement were done can be formed to be a reference or guidance if we want to make or design cooling system on a mould and guidance

for making a cooling parameters in die casting process.