Research Paper

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Process planning for development of Gears

Engineering

KEYWORDS : Gear development process, machine utilization, cost reduction

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ABSTRACT

Process planning analysis for the development of a gear is generally a modification process for developing that gear by a different ways. As the result of this analysis we can able to improve quality of the gear, customer satisfaction, rate of production and ultimately overall costing of that gear.

In this analysis we will develop various "Gear" by changing their initial routine for getting meaningful results.

With the help of this process planning analysis for the development of a gear we can understand the different process of gear development and on the basis of this we can able to generate the ultimate process routine for the development of any gear which will improve its quality, production rate and ultimately reduces its cost

1.INTRODUCTION

Process planning analysis for the development of a gear is generally a modification process for developing that gear by a different ways. As the result of this analysis we can able to improve quality of the gear, customer satisfaction, rate of production and ultimately overall costing of that gear.

In this project we will about to study the different-different GEAR development process. And on the basis of these experimental results, we will find out the most ultimate and cost reducing method for gears.

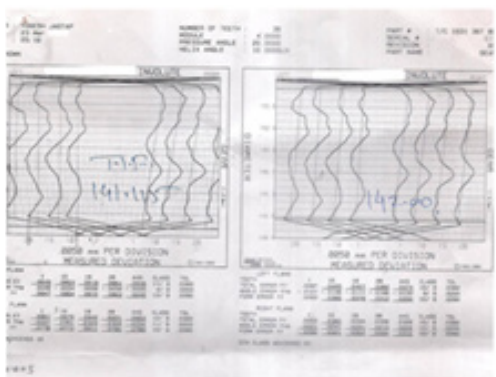
By this analysis we will develop various "Gear" by changing their initial routine for getting meaningful results.

2.TEETH CUTTING

Here as we are developing a gear by shaving route so we have to take a shaving route hob for the teeth cutting purpose & maintain the size as per requirement of shaving. As shown in graph below here we maintain the profile nature as per requirement of process layout.

TEETH CUTTING LAYOUT

TEETH CUTTING GRAPH



As shown in above teeth cutting gear profile graphs we maintain the profile variation as per the requirement of the process layout sheet as variation of profile error maintain around 16 microns & form error which generates the sinusoidal form up to 18 microns but its result will be seen during next operations.

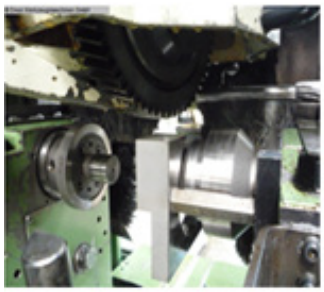
3.SHAVING

Shaving is nothing but a finishing process in development of a gear to give smooth and jerk free motion during running condition of a vehicle.

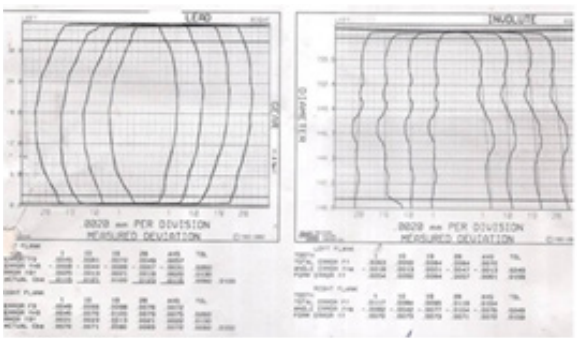
Now as we are trying to develop the gear by shaving route so the next process after teeth cutting of that gear is to shave teeth.

SHAVING CUTTER USED FOR GEAR TOOTH SHAVING

SHAVING OPRATION



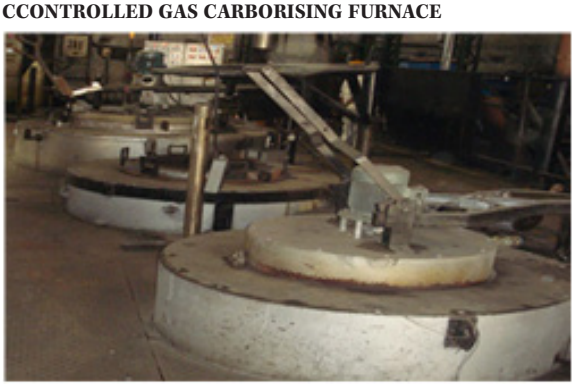
GRAPH AFTER SHAVING



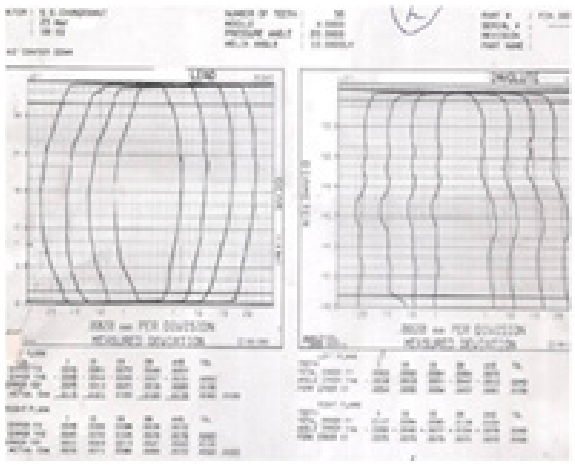
4.HEAT TREATMENT

Now the actual problem after the finishing process of gear i.e. shaving starts when we do heat treatment of that gear for increasing the hardness of that gear as per requirement. During this process we are heating that gear up to 1200°c-1600°c and when any material get heated till this temperature it will definitely affects it . so for removing this problem we used controlled gas furnace as shown in figure

CCONTROLLED GAS CARBORISING FURNACE



FINAL GRAPH AFTER HEAT TREATMENT



As shown in above graphs the results which we are getting in the form of gear profile graphs is now acceptable as during heat treatment the profile which we generates in shaving is just getting in required band width which is as per the requirement of the customer, so that we can give the same quality gear by shaving route which till now we are developing by grinding route and hence it's costing is also get reduced and in this way it will be profitable for our company.

5.RESULTS

Now as we are developing these gears by shaving route.

As we can see by these results are as per grinding of the gear and we can achieve any results which we want, as shown in graph here we are maintain our profile within 8 microns.

But the main and the most important problem which is arising is cost. GRINDING IS ALWAYS A COST WORTHY PROCESS. As grinding machines and its tooling are so costly In this project we are developing these particular gears by shaving route by taking control in there development process so that it will reduce our costing and ultimately increase the profit of the company.

6.CONCLUSIONS

With the help of this process planning analysis for the development of a gear we can understand the different process of gear development and on the basis of this we can able to generate the ultimate process routine for the development of any gear which will improve its quality, production rate and ultimately reduces its cost. Which will be the first requirement of any company and get more profit.

REFERENCE

[1]Akehurst,S.brace,C.J.vaugan,N.D.and Milner,P.J.(2001),Gott changing gears, The Development Of Automative Transmission. | [2]International conference on CV Power Transmission,Yokohama,Japan,sept.1996,Merrit,H.E. (1971),Gear Engineering, Pitman,ISBN 0 273 42977 9 | [3]Gear Development and advanced vehicle technology,Butterworth-Heinerman ISBN 0 7131 3660. |