Recent Innovations for Structural Performance Improvement of Plummer Block

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Abstract

In this review article we have studied and analyzed various factors and parameters which affect the performance of a Plummer block. For this purpose we have studied various research publications of various authors who studied and analyzed the structural performance of Plummer block. After studying these publication we have found out that material , design , optimization methods stress concentration , weight reduction are the main parameters for the structural strength improvement of Plummer block.

Keywords: Plummer block, structural performance, optimization methods stress concentration , weight reduction

1. INTRODUCTION

The bearing block or pillow block is a socket so as toward carries rotary shafts among compatible bearings as well as various accessories. Housing materials to get pillow blocks are usually made containing cast iron or cast steel. A pillow block is commonly referred toward as a housing containing abrasion protection. This bracket refers toward each paddock where this mounted shaft is parallel toward this mounting surface containing this aircraft as well as at this centerline containing these mounting holes, unlike various types containing flange blocks or flange units.

2. FACTORS FOR PERFORMANCE FOR PLUMMER BLOCK

2.1. MATERIAL OF CONSTRUCTION

Mr Kashinath Mande [1], analyzed as well as calculated this stresses created into this Palmer block. Into this study, a plumb block is modeled as well as analyzed using a finite element method. This ANSYS version 17 commercial limiting factor packages is used toward resolve this issue. Palmer block modeling is done using 3D software. Here CATIA V5 is used toward model. This simulation part is performed using ANSYS analysis software. Among this application containing boundary restrictions as well as tensile loads, this plumb block is analyzed as well as this values tabulated. Instead containing white cast iron as well as gray cast iron, they used structural steel as a new material. They are finding this change effective into this case containing Van Mises Stress.

Professor Swati Dutti, etc. [2], studied this project toward calculate this pressure into this plumb block as well as toward some extent improve this plumb block performance among CATIA V5 as well as FEM. After studying this plumb block

as well as analyzing this plumb block axis, they concluded so as toward this material plays a very important role into reducing joint-working stress, especially into this plumb block axis. General Chat Lounge They replaced materials such as gray cast iron (ASTM 20 grade (EN-JL 1020), ASTM 35 grade (EN-JL1040), ASTM 60 grade (EN-JL 1070)), stainless steel as well as titanium alloy, as well as stress variations. This found equilibrium (scissors), scissors stress as well as total defect are found into this same region as well as maximum pressure. They concluded so as toward an increase into this diameter containing this palmitate block shaft might save this joint's orientation.

Nippon Kumar, Dr. Gian Bhushan as well as Dr. Pankaj Chanda [3] studied to get stainless steel, gray cast iron, magnesium, aluminum, stainless steel, structural steel as well as gray cast iron blocks. They analyzed stress as well as stress under different load conditions. This CAD model containing this plumb block is built into this CATIA V5 R20 as well as analyzed into ANSYS 15. It has been observed so as toward this pressure produced to get this magnesium plumb block is low as well as this aluminum pen block may withstand maximum stress loads. Failures

Kodali Vikas as well as Kondola. Deepti [4] analyzed this E-glass as well as S2-glass epoxy resin plumb blocks, which include two serial holes so as toward range as containing this free edge containing this plate toward this diameter containing this first hole as well as this diameter containing this sample width. as well as also this distance between this center containing this diameter containing this two holes. Structural as well as fatigue analysis is performed among this cosmos. When observing this results containing structural analysis, this stress as well as displacement values were lower than their corresponding resistivity values. He concluded so as toward this use containing composite materials is safe to get series plumb block shaft seals. This loss factor is very modest to get both materials as well as this service life is approximately 106 cycles.

Sh. Jan Bhasha as well as Hari Shankar Wanka [5], he studied this design as well as analysis containing a plumb block used into energy transmission. this Palmer Block is theoretically designed to get an axial load containing 50KN. this final dimensions containing this theoretical calculation, this Palmer Block model is made into this Katia V5 as well as this model is taken toward ANSYS as well as synthesized among multiple materials as well as this best material adapted toward this given design load. It is confirmed. It is concluded so as toward Teflon is best to get design as well as is close toward this stresses obtained as containing stainless steel as well as cast iron.

Jeon-Yoon Kim, Seung Ho Han as well as Kwon Hee Lee [6] studied this existing material made as containing GCD45 as well as converted it toward 6060 M as well as a maximum design technique to get installing into crabs. Recommended this lightweight design containing this plumb block shaft. Six design designs were chosen to get small plumb block axis correction, as well as this relevant criteria to get rigidity as well as durability were considered as design requirements during this correction process. This method containing optimization is based on this met model which uses this optimization technique as well as this rig manipulation method. This results show so as toward all this rigidity as well as durability restrictions are satisfied among this A16082M, while this plumb reduces this block shaft weight as containing 60% compared toward this current GCD450.

2.2. **Optimization Methods**

Ms Nilsha Yu Patil, Ms Rupali S Sevin as well as Mr Kashinath H Munde [7] studied as well as calculated this tension into this Palmer block as well as improved this Palmer Block model containing this Tata-9 vehicle. Weight loss is done as containing plumbing block modeling among 3D software. Here CATIA V5 is used toward model. This simulation part is performed using ANSYS analysis software. Among limit restrictions as well as torque applied, this plumb block is analyzed. Then, this topology is removed using this optimization material. Once again, this analysis is performed into a correction model to get pressure as well as error as well as improved values. This maximum stress as well as strain values

was within acceptable limits. An 8% weight loss is achieved at this end containing this fork, which also affects cost, fuel efficiency as well as carbon emissions.

Mahesh P Sharma, etc. [8], I made a careful analysis containing this steering plot block axis. They include designed a plummet block shaft so as toward features dual caliper mounts toward increase braking efficiency as well as reduce this distance toward this axle containing this car's plumb block. This CAD model containing this plumb block axis is created into CREO2.0. Static analysis is performed into this anises work back, which limits this axis containing this plumb block, this braking torque load into this caliper assembly, this longitudinal response due toward traction, this vertical response due toward this vehicle weight as well as this steering response. They also optimized this appearance containing a single axis containing a plumb block as well as conserved material resources. This work toward improve this appearance containing this plumb block axis is done using ANSYS WORKBENCH, which serves this purpose containing reducing weight. This form optimization method used into this study reduced this plumb block axis as containing 19.35%. Plus this safety factory is between 3 as well as 4. This maximum voltage as well as displacement is under control. They concluded so as toward this overall weight containing this vehicle may be reduced toward achieve cost as well as material savings, as well as improve fuel efficiency as well as reduce carbon emissions.

Ms. Nilsha Yu Patil, etc. Alabama [9], studied as well as calculated this pressure as well as defect into this Palmer block containing this Tata-709 vehicle as well as improved this model containing this Palmer block itself. They used Katie V5 to get modeling. Its purpose is toward use this FEA as well as this Taguchi method toward improve this quality containing products designed toward study variation as well as toward design engineering development. Taguchi recommends using this S / N ratio to get measuring quality characteristics so as toward deviate as containing this analysis containing required values. Regardless containing this quality attribute category, a high S / N ratio corresponds toward this quality containing this good. It is predicted so as toward this Taguchi method is a good way containing optimizing machine parameters, as it reduces this number containing experiments. Stress, deformation as well as deformity were within acceptable limits.

Pankaj Dulani as well as SA Jilani [10] studied this problem containing plumb block axis failure due toward crushing, tearing as well as cutting. This purpose containing this work is toward study this calculation containing stress into this Palmer block using an analytical method. This study focused on this optimization containing these design parameters so as toward are set to get this axis containing this Palmer block. This neural network device, an unconventional global correction technique, is used as a solution toward these inherent advantages. this maximum results obtained into this way are compared among a regenerated plumb block shaft among this least effect containing voltage considered as an important factor. After reconstructing this plumb block using this predicted optimization parameters obtained as containing this neural network, this model is used toward generate this voltage value so as toward is compared toward this neural network toward show so as toward there is a better model than this optimized model. Four previously selected models. General Chat Lounge.

2.3. Stress Concentration

Miss Eugene .V. Dover, etc. into Alabama [11], he studied this Plummer Block, an important component containing a sugar mill head so as toward is used to get two bars simultaneously. Experience maximum shear as well as tension pressure due toward this large weight containing this head. this FEA containing this Palmer Block is analyzed as well as several results containing this shear as well as tension efforts were planned. Plumbing block analysis solution is used as standard. This force applied toward this plumb block is 50 kN. This shaft diameter containing this plumb block is suggested toward is approximately 30 mm. According toward theoretical calculations this results containing FEA

software were accurate. It is also concluded so as toward there is some significant pressure near this plumb block as well as this result is useful to get more detailed analysis containing this head toward reduce stress, increase head life as well as reliability.

Dinesh Shonde as well as Kanak Kalita [12], studied stress into tractor trailer during acceleration as well as traction. This forces acting jointly were calculated considering Newton's second law containing motion. This axis containing this Palmer Block is considered separately to get analysis as well as this limiting factor is analyzed. He concluded so as toward this numerical value containing this tensile strength as well as this voltage containing this van masses working on this plumb block are greater if this slope is greater.

Abhishek Mandal as well as Atkharsh Sharma [13], performed sophisticated structural analysis on a universal couple using sophisticated computer-assisted engineering software as well as studied this various pressures as well as pressures created into this joint. These results concluded so as toward this axis containing this fork plumb block faces maximum pressure as well as pressure pressure, as mentioned above. He also stated so as toward this area where this fork as well as this fork plumb blocks axis makes contact is usually subjected toward high pressure tension as well as flexible tension. It is also analyzed so as toward this concentration containing tension into this collar as well as plumb block axis causes frequent wear containing this plumb block block axis due toward this presence containing a mark, which causes this shaft toward sink unnecessarily, which Reduces this mechanical performance containing this transmission system. This leads toward a failure containing this transmission system.

2.4. Geometrical dimensions as well as mechanical construction

Sun Yadav, etc. [14], I did some plumbing modeling as well as analysis. This modeling as well as analysis containing this plumb block is performed using Katie 3D software as well as finite element analysis (FEA), respectively. This ANSYS version 15 limiting factor trading package is used toward resolve this issue. They concluded so as toward this 30C8 material among this maximum allowable stress is 400MPa as well as this maximum pressure produced into this Palmer block is 201MPa. Then this design is safe. He also concluded so as toward a 25 mm diameter plummer block shaft may withstand a load containing 50 kN without failure.

Shankar Majhi as well as Shaheen Baig Mughal [15] analyzed this axis containing this Plummer block during its operation. This theoretical study as well as analytical method used toward calculates this working force containing a fork as well as axis containing a plumb block. This strain at this axis containing this plot block is studied using CATIA V5 as well as this finite element method. According toward their theoretical study, these results containing calculation as well as F.E.A were 50 mm into diameter at 60 KN. They concluded so as toward when this tension into this plumb block axis increases, this bend increases, however as we increase this diameter containing this plumbing block axis, this maximum tension into this force will be eliminated.

Ravindra S. Dhadpur as well as Prof. DM Matte [16], reviewed this problem containing palmist block shaft failure into this rail pair due toward this cut according toward this prerequisite conditions as well as this analysis containing this existing steel material may be replaced among a material Proper elastic. Currently, to get this problem containing palpitate block axis cutting failure, alternatively, plastic palpitate block axes so as toward will accept elastic fatigue may be used, thus reducing palpitate block axis failure. General Chat Lounge this shaft containing a plumb block is made containing plastic material so as toward has flexibility so as toward will allow it toward bend as well as return toward its original shape as well as also toward lubricate it. into addition, this palpitate block axis eliminates rust as well as corrosion, as well as creates low friction between this palpitate block axis as well as this couple's body as well as this palpitate block axis, which improves this opening process as well as reduces this rotation resistance. Turning off, thus,

promotes safety. It is known so as toward this steel palmetto block shaft, either at this time containing installation or after service, may cause a slow palette block shaft, i.e. a palpitate block shaft so as toward does not open. When decoupling completely.

Saurav Das, Vishwinder Britaria as well as Prashant Pandey [17], studied analytically toward calculate stress into this Palmer block. this material containing this plumb block is considered toward be mild steel grade 30C8, ANSY software is implemented as well as a strain contour, displacement contour as well as deformation energy contour were obtained. It is suggested that, instead containing a lightweight steel plumbing block shaft, we might also use a high-modulus as well as high-strength steel plumb block shaft toward further improve this load bearing capacity. this plumb block shape may be changed toward improve this features. Further studies into this direction may be performed using this plumb block axis's ability toward withstand different directions as well as loads.

2.5. Finite element analysis meshing method

Ranganath Odhani as well as Dr. Chakhardhar Good [18], analyzed studied analytical methods toward calculates this stresses created into this Palmer block. They focused on what kind containing mesh is best to get these ingredients. this Palmer model is modeled using Katie, later this model is imported into Hyper Mish as well as both meshes, hexahedral as well as tetra mesh were done. This model is solved using Abacus software. They concluded so as toward this thorns need more stress as well as this eyes need less stress into load situations. They showed so as toward this hexagonal mesh is better than this tetra mesh. He also concluded so as toward further studies might be done into this direction, using this plumb block axis's multiple directions as well as load bearing capacity.

2.6.Weight reduction as well as life cycle

Dhananjay S. Kuliker, Abhay M. College as well as Sopnell S. Kulkarni [19] analyzed a limiting factor into this search to get stress as well as homelessness. To get component modeling, PROE software is used. Pressurizing work, such as meshing as well as analysis work, is performed into hyper works software. Geometry is modified using topology as well as free size correction, which allowed this stress level toward be reduced below this performance threshold. They achieved a mass reduction ratio containing about 7 7%. This tension created to get this model is within acceptable limits which showed this safety containing this model.

Paul Anita as well as V. Hari Shankar [20], focus on optimizing this steering plot block axis, lose weight as a intended task among this required power, frequency as well as rigidity. He used a correction so as toward references various issues into form correction as well as also optimizes topology. This project is modeled into CREO parametric 2.0 as well as analyzed into ANSYS 15.0. Correction containing these results is achieved, so as toward is, this value containing this pressure reduced as well as this weights less. This model is analyzed among cast iron, aluminum alloy as well as glass epoxy mixture. There is a significant amount containing weight loss when using this S-Glass Epoxy Material.

Target Web Saxena as well as Dr. Rohit Raj Vaidya [21] proposed modification containing a material so as toward converted cast iron into a comprehensive polymeric material. This proposed system had many advantages over other systems, such as simplifying this device as well as maximum security, as well as it is environmentally friendly. Composite polymers are characterized as containing a highly elastic material. They used ANSYS 13 used to get plumb block analysis among modified materials as well as variable loads. They conclude so as toward parts made containing composite materials are economical toward facilitate this cost reduction containing this economic system, such as eliminating secondary operations to get parts, such as machining, as well as reduction containing parts count. Toward make it even easier. Compare among metal parts

Vivek Shaw, etc. [22], analyzes modern materials based on this mechanical joint, namely, this Palmer block. They proposed modification containing conventionally used substances, such as aluminum, widely used toward create plumber blocks. They used CATIA V5R18 to get 3D geometry models containing Kalmyk block as well as ANSYS (Workbench 16.2) to get this analysis containing finite elements among conventional as well as composite materials, respectively. These results agree so as toward this use containing composite material not only reduces this weight containing this material. It also improves this life containing this component because this composite material as compared toward conventional material. It shows fewer defects. Due toward this use containing composite material, there is a slight change into this cost containing stress, however this nerve as well as system weight decreased as containing 73.7% as well as 22.02%, respectively [22].

3. SUMMARY OF REVIEW

There review papers summarize that following factors and parameters can be used and analyzed to get the improved structural strength of Plummer block.

- construction material
- optimizing method
- Stress concentrating
- dimensions for mechanical construction
- Finite element methods,
- Weight diminution and life sequence. These are the parameters which can be optimized for getting better results of structural performance enhancement.

4. CONCLUSION

We have studied and analyzed various factors and parameters which affect the performance of a Plummer block. For this purpose we have studied various research publications of various authors who studied and analyzed the structural performance of Plummer block. After studying these publication we have found out that material , design , optimization methods stress concentration , weight reduction are the main parameters for the structural strength improvement of Plummer block.

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