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Design and Fabrication of Proto Type Model for Pipecutting Rotating Machine

Mr.Piyush.M.Sagore[1], Mr.Rohit.A.Pimpalghare[2], Mr.Sanket.S.Gahukar[3], Dr.A.C.Waghmare[4]

[1]*BE Student, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India*
[2] *BE Student, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India*
[3] *BE Student, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India*
[4]*Professor, Dept. of Mechanical Engineering, K.D.K college of Engineering, Nagpur, Maharashtra, India*

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ABSTRACT-
TheAutomationofprocessesplaysacrucialroleinimprovingtheoverallproductivityofIndustry.Itistheelectricallysemi-automated,mechanicallydesignedmodelofsemi-automaticpipecuttingrotatingmachine.Themainaimistoimprovetheoverallproductivitybydecreasingthemanpowercost,utilitycostandimprovingqualityandquantityofproduction.Qualityofproductionisimprovedbyprocessingthemanualcuttingoperationbysemiautomatedrotatingcuttingmachine.Ensuringalltheconditionthattherepeatabilityoftheprocesswithaccuracyandprecision.Thisensuresmaximumeliminationofhumanerror.Italsofocusesonoptimumuseofpowerprovidedforcuttingoperation.

Keywords–
Chainmechanisms,Motor,Cuttingblade,LargeDiameterpipe,etc…

I. INTRODUCTION

Themottoof"pipecuttingrotatingmachine"toslitthepipewiththehelpofcuttingtoolconnectedwithmotorwhichisusedwiththehelpofelectricallyforthedesiredlengthandalsocutthepipeinlesstimewithleastwastagegeneratedaroundthepipetomakeitcost-effective.Designedandfabricationisusedforcuttinganypatternofanobjectlikecircular.
Thisprojectworksundertheapplicationsofmechanicalandelectricalbasedsystems.Accordingtothetypeofmaterialtobecut,thecuttingtoolcanbechangedThisMachinecanbewidelyavailableinalmostalltypeofindustriesinwhichthepipecuttingprocessisamainoperation.NormallythecuttingMachineismanuallyhandoperatedoneformediumandsmall-scaleindustries.Inourprojectlargesizepipecuttingcanbedone.Thedesignofrotatingpipecuttingmachineisdonebyusing CATIAV5softwareaswellasfusion360.

II. PROBLEMIDENTIFICATION

1]Intoday'seconomy,thekeytosurvivalisproductivityaswellasquality.Thismeansimprovingefficiency,minimumdowntimeandreducinglabourcost.Rotarycutoffmachinehavedevelopedintoaneffectivemethodofachieving.Thisistocuttubeandpiperegardingoflotofsizes.
2]Basically,therotarycutoffmachineoperateslikeamotorversionwiththehelpofbladeoranycuttingtool,orplumberscuttingtools.
3]Inthisprojectwearedealingwiththecontractionofcostefficientmodelandsafemodelforworkerwhoisgoingtoperformoperationonthemodel.
4]Aswehavealreadyseeninmanyalreadyavailablemodelthatitconsumeshighelectricityandneedshighmaintenancecostduetomanyfacturesandbreakageinbladeworkingonhighspeedduetowhichproductioncostgetshigh.
5]Inourprototypemodelwewillfocusonincreasingproductivityefficiencyofbladeandcostofconstructionshouldbeinlessthantheothermodelavailableinindustrieswithhighefficiencyandworkability.

III. LITERATUREREVIEW

Menghaniet.al.[1]hasdevelopedautomaticpipecuttingmachinetocutthebar.Duetoitscompatibility,reliabilityitisabletocutbarsofdifferentmaterials.Itprovidesanalternativetotheexistingautomatic PVC pipecuttingmachine,intermsofautomatingthepipeentryintothecuttingapparatus,eliminatespowerfluctuationandlesserinitialinvestment.
Bipinchandraet.al.[2]hasdesignedandfabricatedAutomatic-PneumaticPipeCuttingMachine.Pneumaticmechanismisusedinmachinewhichreducethemanpower,maintaintheaccuracyinpipecuttingprocess,fulfillneedofmassproductioninshortestpossibletime.
M.Nalbantetal.[3]implementedtheTaguchimethodtofindoutoptimumcuttingparametersforsurfaceroughnessinturning.ANOVAmethodwasemployedtostudytheperformancecharacteristicsinturningofAISI1030steelbarusingTiN-coatedtools.
M.AntonyXavioretal.[4]carriedoutanexperimentalinvestigationtodeterminetheinfluenceofdifferentcutt

ingfluidsontoolwearandsurfaceroughnessinturningofAISI304withcarbidecuttinginsert.

P.BalashanmugamandG.Balasubramanian[5]proposedatechniqueinwhichgrowthofthecutteriscarriedoutintheupwardanddownwarddirectionusingpneumaticdoubleactingpistonandcylinderunitarrangement,alongwiththefootoperateddirectioncontrolvalve(DCV).

IlhanAsilturketal.[6]focusesonoptimizationofturningparametersbasedonTaguchimethodtominimizesurfaceroughness(Ra&Rz).Experimentalhavebeencarriedoutusing L9orthogonalarrayinCNCturning.Dryturningtestswerecarriedoutonhardened AISI4140withcoatedcarbidetools.Ithasbeenobservedthatfeedratehasthemostsignificanteffectonthesurfaceroughness

M.Z.A.Yazidetal.[7]observedsurfaceintegritywhenfinishturningInconel718,ahighlycorrosiveresistant,nickel-basedsuperalloy,underthreecuttingconditions(DRY, MQL50mL/handMQL100mL/h).Themicrostructureanalysisusing SEMonthemachinedsurfacesuggeststhatseveredeformationtookplace,leadingtomicrostructurealterationatsubsurfacelevelmeasuringfromafewtoseveralmicroninthickness.

Shitalk.Sharmahaveprovidedanalternativetotheexistingautomaticpvcpipecuttingmachine.thismethodeliminatepowerfluctuations&lesserinitialinvestment.

US2300457AbyMARIOTT-Thisinventionrelatestostockbarfeemechanismforautomaticmachinetoolsorautomaticscrewmachines,whichmechanismembodiesaplungermovableinatubeorcylindertowhichamotivefluid,asair,issupplied.

IV. OBJECTIVE

Theobjectiveistoimproveproductivitybydecreasingthemanpowercost,utilitycostandimprovingqualityandquantityofproduction.

V. METHODOLOGY

Ourmachinehelpstocutlargediameterpipewiththehelpofcuttingtoolconnectedwithmotorandmotorisconnectedwithgearwhichwillrotatesonchain.Theinstrumentconsistsofdifferentcomponentsforperformingtheoperationswhichareasfollows.

1.Electricmotor
2.Chain
3.Gear
4.BoltandNuts
5.Bearings
6.Cuttingtool(Blades)
7.Waterinjector
8.Electricwires

VI. FUTURESCOPE

Thismachinealsocanbeusedincuttingmetalhollowpipes,concretepipesorPVCpipes.

1.Inthisweareusinglessweightedmachinesothatitcan'tdamageanypipeandeasytocarry.
2.Itoperatesonlesselectricitysoitisveryelectricallyefficient.

VII. CONCLUSION

Pipecuttingrotatingmachineisamechanizedindustrialprocessthatcutsdesirepipeortubetogetaccuratedimension.Typicalprofilescanbecuteasilyinlesstimewithhigheraccuracywithhighersafety.

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REFERENCES

[1]. Prof.P.D.Menghani,AkarshJaiswal,NikhilJain,andMansiBorse,"AutomaticPipeCuttingMachine",InternationalConferenceonIdeas,ImpactandInnovationinMechanicalEngineering(ICIIIME2017)Volume:5Issue:6

[2]. Mr.PanditMandarBipinchandra,Mr.PathanArfatSherkhan,"Design&FabricationofAutomaticPneumaticPipeCuttingMachine",InternationalJournalofModernTrendsinEngineeringandResearch,April,2016.

[3]. Nalbant,M.,Gokkaya,H.,Sur,G.,2007,ApplicationofTaguchimethodintheoptimizationofcuttingparametersforsurfaceroughnessinturning,MaterialsandDesignVol.28,pp.1379–1385.

[4]. M.AnthonyXavior,M.Adithan,Determiningtheinfluenceofcuttingfluidsontoolwearandsurfaceroughnessduringturningof AISI304austeniticstainlesssteel,journalofmaterialsprocessingtechnology209(2009)900–909

[5]. P.BalashanmugamandG.Balasubramanian," DesignandFabricationofTypicalPipeCutting Machine",May-2015