

A NOVEL STUDY OF DIFFERENT MECHANICAL BENDING COMPONENTS.

Abstract:

Bending is prime requirement operation in the mechanical product so there are various methods which has deal with the bending operation for the various components, components geometry is responsible for the various good life span of the mechanical components, here this paper work has focused on the mechanical bent component behavior under the different loading condition and its performance evaluation studied carried out. There are different methods have been discuss here like spring back method, incremental forming method, additive bending method, four point bending test, these are the various method which has deal with the optimize the bending operation for various mechanical components. During the manufacturing of the cylindrical components and its bending operation there may occurs the different cracks that cracks can be handle by the fractures mechanics so it has also discuss here.

Key Words: *Bending behavior, sheet metal, pipes, rod and wires bending.*

Introduction:

In 21st century time is very important and concern parameter for development of product. High competition can be bit by only reach the control and monitor time oriented production and manufacturing. Every product has a specific life cycle during that period of time organization have to reach the high demand of product. So every product development process has required specific manufacturing and machining operation. Different manufacturing operation is like casting, forging, hot rolling, cold rolling process etc. different machine process like facing, shaping, milling, bending, boring, drilling etc. Due to introducing a computer numerical control and programmable logic control system mechanical traditional machines are convert in modern technological aspects. This interdisciplinary approach will helpful for the fast but quality production.

Bending operation is utilize to bend sheet metal, pipes, rods, wires etc. bending operation is can be handle manually but it has required specific time so it is time consuming technic. But by the use of computer numerical control system and programmable logic control system this time consumption can be control so it is very helpful to reach high demand of bended sheet metal product, pipe product, wire products etc. bending has prime required operation for any product weather it is mechanical component or any other interdisciplinary product also.

Review on different bending Components, its mechanical and fractured properties.

Bending is one most and applicable operation for the sheet metal product, so different machines are utilize for the perform of bending operation and here shows the result of a hybrid approach of the bending machine and CNC milling machine that is affect the angle accuracy of sheet metal, many a times bending product has been defect due to angle operation it takes sudden fractures and so for that it is very tough to optimize in high competition time and cannot bare the more fractured material and wastage so this hybrid approach will helpful to reduce this query and inventers had try this hybrid approach for 90 degree and 135 degree sheet bending operation and got the precise conclusion^[1].

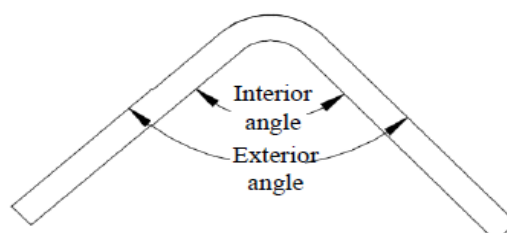


Fig 1. Plat Bending Diagram^[1]

The inventor had been develop a three roller bending machine and so for that they had made set up with consideration of basis triangular moment distribution geometry between the rollers, and also consideration for stress strain relation of material. The inventors has done calculation based on circle function which results more good than the curved based model function. As a result shows this article is yield of bending in use of circle mode function is more nominal than the curved based mode^[2].

The innovative art of this research article is to machine operation have to handle multiple task on one component, bending is required in high accuracy, this paper show case the hybrid manufacturing features with the combination of bending, deposition and machining process, Due to this use of hybrid manufacturing features metal depositing and removal both are easy to handle, this can be use because of the additive manufacturing process, bending consider as a new part of this additive manufacturing process with the hybrid approach. thus the result can be obtain by this paper is bending is very affective features in hybrid approach, because the machine tool accessibility, bending angle, fixtures flexibility these are the high lights features point by which bending is handle in additive manufacturing process^[3].

Fig 2 Additive manufacturing Bending component^[3]

This article has says the deformation manufacturing has two combined consideration thin structures machining and incremental forming, this will help to bend the thin plate by the incremental forming process, the major contributor to formed the thin structure is elastic spring back for the dimensional accuracy, this work has been directly relate to the experimental study of elastic spring back in deformation machining has bending component has performed, here component has been machined by 3 axis CNC and dimensional accuracy measured by the CMM, the outcome of this research has been says that feed rate and bent angle are very good enough to reduce the deformation during the bending and other curvatures are also being helpful to the system^[4].

In an energy pipe lines there is high requirement of different cold bent pipes which has been develop for given direction to the fluid, so that it has been required cold bent jointed that pipe bend affect by the constant contact of fluid, so here a buckling strain and moment capacity have been reduce so this article show the research work has use different any tropic material specimen to solve the this problem, they have been done the coating and did the experiment and got the result for anthropic material is in degree/diameter does not change but the result shows the good enough to handle bucking strain capacity of the cold bent joint pipes^[5].

In a ship building industries the bending of hull and ship metal is much challenging job that should be difficult to handle so that proper incremental process have been used to handle the difficult sheet metal part in the shipping industries, this article present the work of incremental bending process to obtain critical curved shape of steel plates by the series of sequential punches here plan blank plate should be fixed first and supported by the flexible incremental bent system of target and required shape of tool path layered by layered and step by step. here spring back compensation method also use for the check the checking of prototype feasibility and validity, the final out comes shows this experimental analysis is satisfactory handle the complex shape sheet bending for sheep industries with the help of step by step it means incremental bending forming process^[6].

Many of forming technics are useful for the decent result but development of high and precise accurate product so incremental forming techniques is pretend as a good enough and power full for single point bending in sheet metal material

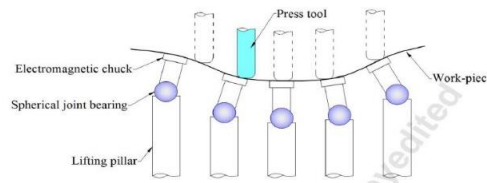


Fig 3. Sheet metal forming by incremental method ^[6]

The miniature bending test is required to use for the finding a mechanical behavior of the material and its properties. The miniature bending specimen has been hold horizontally jaw punched and vertically spherical ball travels route, here in this paper the written statement shows the previous query is large amplitude plastic deformation is unwieldy , so for that they have used finite element method carried, here investors work has been show the load verses deformation can be obtain for the test result either it will change or not that should be check here because it is affect the bending of material, the solution sows the result that following parameter has been affect and consider contact, friction, elastic plastic bending, and radial strengthen which is parametric affection is increase^[7].

The quality of natural gas pipe system must be check after manufacturing of and there is must be check defect of manufacturing pipe, the main purpose of the this paper for research is to be evaluated the load angle and effect of loading mode, and check different crack depth, during pipe bent joint many times a welding had been done for the strong joint but some time it refers for the crack and that crack is reason behind fracture from the bent joint in natural pipe gas line so primary work important is to see the use of different method has been use to handle crack propagation like tangent insertion method, elastic plastic fracture mechanics and curved three point bend specimen these will help full to obtain the solution of crack propagation and inventors suggest that the material properties of the pipe significantly affect by the welding material, the percentage of strain failure is decrease with the increasing a ceros section head of the specimen^[8].

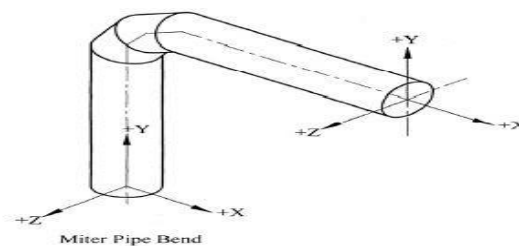


Fig 4 Pipe Bend ^[8]

The four point bending test was done by the French alternative energies and atomic energy commission for the study of mechanical property and integrate behavior of welded pipe, even though the crack generation was check by the optimal camera and electrical potential drop method, the main focus of this research work is to be devoted to the four point bending test and mechanical behavior pattern of the to check fractured parameter by the use of FEA method so different four point have been check and analysis have been done by the inventors so that as a result of the check residual stress is generated that should be handle during the welding of pipes and that is also affect the wall defect of pipe due to constant contact of the fluid. Different temperature is also affect the wall thickness and crack damage of pipe that should be tough to rely on direct manufacturing and bending operation so this four point bending test will useful for the quality check of welded bent pipe^[9].

This paper present the finding a damage in pipe line, may that damage crack is in line of pipe direction, may it is in redial direction, may it is in torsional direction so for that every damage crack different methods are used to detect damage. Axial pipe line has been detected by the torsional guide way reflection of 90 degree,

this paper mainly show the localize damage detection in carbon steel pipes. The reflective method can be fruitful to handle and monitor structure health beyond the industrial pipe line bends. by the use of this monitor system some result had been describe the inventors small bend conduct mode conversion form fundamental torsional wave to feature wave, reflected waves amplitudes for standard small radius elbow pipe is very low damage is detected due to localize stress and analyzing frequencies of damage^[10].

The main focus of the represent the paper is to be investigate the crack depth on the load limited pipes under the in line plane bending, The experimental work deal with the investigation of melty meter pipe bends, with a bent angle is 90 degree, and three main point under the cross head speed is 500 mm/min, here use the intrados material for the pipe manufacturing process so due to that during its pipe bending techniques must not be to damage and crack generation will not occurred so that inventors had been check by the use of polyethylene mitered pipes material to bend, now they had been analyses the crack depth of the mitered bend pipe, the pipe made up from the high density polyethylene so in under in plan bending moment will shows the following result by the author the load deflection behavior for 90 degree angle is obtain to resist the crack damage control by the change of material of mitered pipe this will help full due to the use of high density polyethylene material of bent pipe^[11].

This paper has to be relate with the fractures mechanism of the dynamic behavior of bend component and that bending in the in plane bending condition so that the research work is rete to the typical bending moment and fracture behavior of the system. here for the experiential purpose this plate has been made up by the polymethylmethacrylate and epoxy sheet, using epoxy based adhesive material generate the newly develop sheet, high speed imaging device is couple with the different parametric sensing element, here the main thing is stress intensity factor that has been handle by the specimen material and its performance as the outcome result of this result work the authored have been conclude that due to layered by layered sheet manufacturing technique is utilize so that the focus on damage and creak should be easily handle and care point in sheet bending condition^[12].

Conclusion:

The present article is the study behind the different bending component, that has required to deal with the damage and fractures during the manufacturing and bending operation so it has to be handle very carefully and precise for the accuracy purpose, so this all propose work is regarding to find the research have been carried out for the different bending combatants, even though the this study has been relate to the gaining knowledge of the bent different components like sheet metal, pipes, rod, wire etc. there are many techniques which has been studied here for the control and monitor the damage for above mentioned components. It makes the sense that every manufacturing parameters widely affect the bending process and also machining parameters has been affect, so over all approach of the this study to bending behavior for the sheet metal, pipes, wires and rods.

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