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Literature Review of Rolling Mill Dies For Housing-less Mill

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A B S T R A C T

Rolling is one of the most important shape changing processes used in the steel industry. During the rolling process due to overdraft and poor structure of die design, cracking and breaking of rolls occurs, leading to the failure in the mill. There is the need for a good rolling dies based on a piece of work property. In the current article the design methods of various researchers were introduced. Update on activities related to Finite Element Analysis (FEA) methods and material selection is made and presented.

Keywords: Rolling, Mill, FEA, Analysis

1. Introduction

Rolling is a metal forming technique in which metallic inventory is exceeded via one or more pairs of rolls to reduce the thickness and to make the thickness uniform. Rolling is the most broadly used forming method, which presents high production and near manage of final product. Higher reduction is feasible in hot rolling while as compared to cold rolling, but precise floor finish may be executed in cold rolling when as compared to hot rolling.

Rolling receives application in the production of engineering and military equipment, ships, bicycles, pipelines, train vehicles, bridges, boilers, automotive industry, factory buildings, construction industries, infrastructure projects, elevators, household appliances, electrical appliances. Almost all metals, which can be used in molding, are subjected to some common conditions for subsequent processing. Manufacturing companies supply steel in the form of metals found by throwing liquid metal into a square section such as Slab (500-1800 mm wide and 50-300 mm wide), Buildings (40 to 150 sq mm), Blooms (150 to 400 sq mm). These shapes are also processed by hot folding, forcing or extraction, to produce standard materials such as plates, sheets, rods, tubes and parts of the structure. The items to be wrapped are drawn in the form of a conflict between the surrounding gap. The compressive force applied by the rolls reduces the tension of the material or alters its position in the cross section. The geometry of the product depends on the contour of the roll gap. Wrap materials are cast iron and cast iron due to their high strength and wear resistance requirements. As you roll, the crystals grow in a spiral pattern. As you roll, the crystals grow in a spiral pattern. In cold crystal

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rolling more or less it retains a longer shape but when the hot roll begins to change after exiting the conversion area. The peripheral velocity of the rolls at the entrance exceeds that of the thread, which is dragged in if the coefficient of interaction is high enough. In the area of deformation the size of the strip decreases and expands. This increases the speed of the line at the exit. So there are neutral points when roll speed and line speed are equal. At this point the direction of the conflict is reversed. When the contact angle α exceeds the collision angle λ the trucks cannot pull the new line of torque, power etc. increase and increase in the length of the connection of the work of the roll or radius. The purpose of this article is to study the activities reported by various researchers in thermal rolling, thus being able to identify process variables that affect the higher quality of the rolled product.

2. Literature Review

Remn-Min Guo [1] has developed a method by combining the Goodman line method, as well as the accumulated injury method to measure housing health. A system was also developed to measure the upper and lower limits of housing life using an equal stress scale. These methods can be widely used in all mechanical components under cyclic loads.

The widespread use of the Goodman line method in conjunction with the Miner cumulative damage method provides a way to measure the life of a home by knowing the energy spectrum and the S-N curve or the Basqin figure. A power spectrum that incorporates rapid power changes can be established by combining the ratio of the coil variation with the coil variation to the coil.

The former is derived directly from the strength and / or weight gauge gauge. In order to detect variability during the impact, an FM tape with high frequency data collection was recommended. The variation in coil strength to coil can be found in the calculation of the rolling schedule or the reading of the load cells of various objects, widths, and gauges. Amplitude pressure is computerized from the amplitude to the mean value.

Other emerging statistics and speculations lead to a higher and lower life expectancy. Using this first measure can eliminate in-coil force measurement, which is usually expensive and timely. The average power rating can be calculated directly from outgoing schedules according to the expected product mix. Medium amplitude strength can be measured by looking at a line of rolling power lines. Analysis of the detailed element determined in the grinding area was required to convert the force into pressure using the measurement law. If the lower limit exceeded life expectancy, there was no reason to go up or even an accurate solution; otherwise, further studies may be needed.

In presenting and discussing structural analysis and design the engineer / analyst constantly emphasizes the importance of strength and durability and seeks to find a balance between the two that fits the design in hand. It therefore makes sense in presenting the development of the structure that both of these priorities become the objectives of the process rather than one as a goal and the other as an obstacle as has always been the case. At first it sounds very good to try to increase strength while at the same time increasing strength. And the goal of increasing the capacity of the structure should, in the minds of the authors, be in a position to reduce the maximum stress under all load cases. Structural development traditionally refers to the equilibrium of pressure or the attainment of a "fully compressed" design as the purpose / limit of pressure. The authors speculate that such a goal, especially one associated with FEA, could lead to higher environmental stressors that do not improve structural strength.

G. P. Steven [2] aimed at assessing the application of the structural development approach to these multi-conditional design issues. In order to assess the overall effect on the composition of the variance due to these two conditions of suitability, a weight scheme was adopted, in which the weight characteristics emphasize and / or balance the intensity and intensity. The work can accommodate a variety of conditions including composition and topology in many terms. Also important functional features of potential high pressure and multiple load cases are considered. A few examples illustrate the power of a proposed design problem-solving design for multiple conditions.

J. H. Rong [3] proposed an improved structural approach against binding in order to maximize the critical binding load of a fixed weight structure. First, based on the output of alternatives to eigen values, sensitivity numbers of the original eigen value or multiple initial eigen values (eigen values divided close to duplicate) were obtained by performing a switching function. In order to successfully maximize the buckling load feature, a set of ideal conditions for closely separated eigen values and repeated eigen values were established, based on the sensitivity numbers of the original eigen values. A few examples are provided to illustrate the validity of the proposed method.

Kurt Maute [4] introduced a collaborative approach to the selection of design terms and the development of development problems within the computer-assisted engineering development process. A key part of the proposed approach was the development of a cross-sectional development problem for the purpose of determining the preferred design of a developer. These preferences are identified based on a collaborative modification of the initial preparation effect which is the solution to the initial problem statement. The development of the opposite development problem has been introduced, which was based on a multi-purpose approach that leads to a clear performance problem that is not expensive to solve electronically. Numerical studies related to the problems of improving the structure of the structure show that the proposed method has been able to identify developmental conditions and the development of a development problem, which drives user-friendly transformation.

Theodore G.ToRidis [5] developed a common method of elastic-inelastic analysis of solid frames, which was based on the finite element method, as well as the concept of initial hardness as it is used in plastic types. The analytical discourses obtained in this way have been used as a basis for the development of a general purpose computer program. This system enables the user to use a few options associated with vertical, free movement, flexible flexible analysis and plastic analysis of two- and three-dimensional structures.

William Prager [6] encountered common difficulties in constructing problems for the design of a good structure .With a good design of a fixed or durable foundation for a given structure, a method has been introduced where necessary and adequate international standards can be obtained when determining the upper limit. in line with the truss under one or more sets of loads and the lower bond is determined by the cross-sectional area of each bar. The extension of the path to other structures and obstacles is briefly discussed in reference to the literature, and given the general nature of the conditions for a positive outcome.

Rafael Febres [7] discussed the behavior model of steel structures under the effects of flexibility. The model focuses on the definition of failure due to local binding. It was thought that the main inelastic phenomena involved in this process: plasticity and local binding, may be incorporated into the incoming rings. The model assumes that in fixed frames, two local bindings can appear in the plastic hinge area: one for good time and one for bad time. The expandable behavior of independent members with two local responsibilities was considered collective. The behavior of the plastic was defined using the concept of time-equivalent in a damaged plastic hinge. A new hypothesis, which the authors call "counter-buckling", was introduced. The concept of counter-buckling states that as a result of the emergence of a single local binding, the other effect is slightly blocked. The concept of counter-buckling has been used to describe the emergence of local buckling during a loading cycle. Finally, the model was validated by mimicking a few test numbers on independent members and independent structures.

K. G. Mahmoud [8] seen that the improvement of structure using mathematical planning methods can only be used effectively in conjunction with almost obvious models. In the workplace an effective development method that incorporates a limited segmental analysis model, a sequential quadratic schemes algorithm that combines an effective set strategy with a straightforward approach to project sensitivity analysis was developed. The approach involves solving a series of almost high-quality problems that are below the range of motion provided in the design area. A new approach to constructing highly adaptable measurement functions in the original works was proposed using the values of state variables (subtraction and / or pressures) and your exit points obtained through the development process. Other measurement techniques have been introduced and comparisons were made using real-life vehicle structures to demonstrate the strength and generality of the measurement concepts in building development.

V. Braibant [9] focused on the use of development strategies in the framework of Computer Aided Design and Finite Element Methodology. A design model was developed that can be used for structural measurement and layout design. An important aspect of the work was the sensitivity analysis, which includes the computer output of the functions that define the developmental problem. Attention was limited to dry line problems involving variability. A new and common method of mathematical planning was described. With the architecture of the structure and the excellent design, the approach combines the previous approaches and has excellent interlocking structures. A sample of numerical applications was provided showing the efficiency and reliability of the proposed structure. Finally, the concept of collaborative redesign that allows the designer to monitor the development process in a clear terminal was considered. It was anticipated that in the future this concept would lead to the integration of architectural development strategies into Computer Aided Design programs.

Yunliang Ding[10] identifies the problem with the design of frames with presses under pressure, displacement, and paper binding issues has been considered as a two-level structure development. The weight of the structure, the locations of the different categories of independent objects were at the system level considered as the intended function and the flexibility of the system design, respectively. They will satisfy complete deterioration and complete binding issues. At the partial level the aim was to reduce the weight of each individual element, and the different proportions were the flexibility of the component structure. Local pressure and binding on each individual element have been partial issues. Yunliang Ding [20] added another barrier to systemic flexibility at the partial level to ensure consistency between system flexibility and component.

M-M. E. M. El-Sayed [11] introduced a way of considering the needs of a tired life in the overall construction of buildings. The basic idea was to use load history data combined with structural stressors and fatigue structures to calculate fatigue health during the development process. The need for health is considered to be a separate barrier and the weight of the structure as a function of purpose. To illustrate this point, a development work with the challenges of fatigue health and fatigue health calculations, based on the modern approach, was discussed.

M. Haririan [12] described processes for analyzing the sensitivity of design and efficiency of indirect structural systems through the Adina computer program. The construction of a structural design problem, the sensitivity analysis of the design with indirect feedback using the processes of the mounting limit factor, and the two techniques used by Adina in making the design described. The website and modem information management system were used to integrate Adina and analyze project sensitivity and development modules. Comparison of high-quality designs with straightforward and indirect structural responses for functional trusses and geometric nonlincarities.

Michael A. Vehmeier [13] proposed a new approach to improving both structural parameters and the benefits of consistent control over time while incorporating the effects of short-term loads. The power of control controls were written as clear response functions and included in the country equation, which is embedded directly in the indicator of additional performance. Variations were taken with respect to all design variables (region, region, building parameters, location and / or response control benefits) in order to generate system control statistics. Computer code was developed to solve the resulting statistics and simultaneously solved to obtain the correct control benefits and structure parameters using gradient-based search techniques. The resulting structure was appropriate to the specified service area (initial conditions and / or temporary loads) with the advantages of constant control (location and / or response rate).

Raudensky [14] has identified a number of factors that may contribute to product quality that contribute to the production of hot mills. Improper chemical composition of steel slabs is a key parameter that can accelerate defects in final products.

Schlick [15] suggested that otherwise, incorrect spacing between work trucks could lead to many shortcomings in hot products. However, it is difficult to manage the constant gap between work trucks because the load is applied to the work trucks to disable a piece of metal that could cause the work trucks to deviate. The effect of deviation from the work truck can cause the working tool to be smaller on the sides but larger in the middle. This is called the convexity of the workpiece which can cause cracks in the work truck's edge. In addition, the excess temperature in the furnace can alter the characteristics of a hot product that may produce cracks and cracking of the hot product.

Miyake et. al. [16] be informed that labor power must be controlled wisely because major energy changes will affect the final product. Mill spring is also a feature where the folded sheet metal is larger than the required size due to the large rolling force that distorts the work trucks. In addition, internal stress is often the cause of disability. This is because unbalanced horizontal pressure action caused by work trucks and abnormal geometric structures of metal pieces when inserted into a grinding machine, can create an internal stress pattern.

Seki et al [17] identified that the rolling speed of work trucks and the speed of installation of a working piece affect the quality of the final product. The size of the workpiece and the folding speed is best adjusted as it also needs to be able to create flaws such as large residual size.

Suraj et al [18] found that in general, it is common to see that the middle part of the metal has a longer length. Therefore, the edges of the metal work are considered to have an unequal size. In addition, the flow of the metal plate is also a cause of damage because it can lead to changes in the size of the final product. There is a so-called crocodile error that can occur due to the abnormal flow of the working metal.

Raudensky et al [19] suggested the development of a curvature curve stating that the deviation of the work surface is a common problem in the thermal curvature process. To prevent this from happening, the maximum amount of workpiece and the size of the workpiece in a hot grinding machine are reduced. Otherwise, the top of the working truck should always be in good condition as it may prevent the working piece from deviating.

Satish et al [20] reviewed the development, production and maintenance improvements discussed above. In addition, some comparisons across all procedures were performed and evaluated. The main objective of this work is to improve the quality of the thermal wrapping process in order to achieve high productivity, quality, durability of thermal wrapping machines. The four-P model is supported to achieve the objectives and is shown below.

1. Planning
2. Practices
3. Process Improvements
4. Performance Parameters

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