International Journal of Advanced Research in IT and Engineering

ISSN: 2278-6244
Impact Factor: 7.436

STUDY OF THE EFFICIENCY OF METHODS OF RECONSTRUCTION OF SHAPED FACES.

A.M. Gafurov.,

S.SH. Raxmonov.,

A.A. Musajonov

Fergana Polytechnic institute

ABSTRACT:

With the expansion of the product range, the dynamic development of such production involves a constant increase in the need for technological equipment of CAD/CAM/CAE systems. It is characterized by high-quality and resource-intensive production conditions, the development of new products, the development of technological systems and complex production technologies.

Key words:*system, G-code, RDB machine, software, production, design, details, cutting tool, cutting process*

I. METHODOLOGY

Modeling of metal objects.

In modeling metal molds, sheet metal molding is modeled on a computer using special software. Simulation can detect errors and problems, such as wrinkles or cracks in parts, on a computer at an early stage of formation. Thus, there is no need to create real tools to run practical tests. Molding imitation has become popular in the automotive industry as it is used to design and optimize every sheet metal part.

To describe the process of metal forming, there must be a model of the real process. This is calculated in software using the finite element method based on implicit or explicit increments. Model parameters should describe the real process as accurately as possible so that the simulation results are realistic.

Metal forming simulation is the modeling of the whole sheet metal processing chain.

Metal mold simulation allows you to quickly and accurately simulate the entire molding process, including drawing and secondary operations, as well as elastic recovery. In this way, the section can be developed fully and efficiently.

Typical parameters for molding modeling are, for example, part and tool geometry, material properties, compressive forces, and friction. The simulation calculates stresses and deformations during the molding process.In addition, modeling allows you to recognize errors and problems (for example, wrinkles or splitting), as well as results (for example, strength and thinning of the material). Even the elastic recoil, the elastic behavior of the material after molding, can be predicted in advance. Molding modeling also provides valuable information about the effect of process changes on stamping reliability.

Molding modeling is applied in the whole sheet metal forming process chain.

Modeling allows the detail designer to assess the shape of the metal sheet part at the design stage, which leads to the creation of a part that is easy to manufacture.The process engineer can already evaluate the process at the planning stage and optimize various alternatives using simulation, which subsequently can reduce the fine tuning of the forming tool. Finally, with regard to fine tuning the forming tool, modeling can provide useful information on how to tune an existing, not yet fully functioning tool. You can also see how the process parameters should be adjusted to guarantee optimal drawing results.

Power

Reliability is an important topic in the sheet metal manufacturing industry. Traditionally, companies have focused on the reliability of stamping during the production phase through production and quality departments.Nowadays, modern modeling software allows companies to also solve the problems of stamping stability in the early stages of product design and tooling. In other words, companies can now design better product designs and better tool designs for a reliable stamping process.

With reliable analysis, the stability of the deep drawing process under predetermined process conditions is analyzed. In daily production, parts can be produced without

problems in one day, and even if production conditions do not seem to have changed at all, problems will arise the next day.This is due to noise and changes in the molding process

There are significant but inevitable and uncontrolled changes in drawing parameters in real production conditions. These changes can be divided into two classes:

Noise in the parameters of the molding process, such as, for example, the force limiting the pulling of the roller, bevel radii due to tool wear, pressure changes in the workpiece holder due to the pressing state, lubrication fluctuations, etc.

Noise in material properties, such as, for example, yield strength, tensile strength and r values, which vary from coil to coil and from supplier to supplier

Reliable analysis is performed to analyze the effect of noise variables on the formation process. The user defines the change for each noise variable in the form of an average value and the corresponding standard deviation. Based on this change, multiple simulations are carried out. All simulations available are then analyzed using an analysis identical to the sensitivity analysis. However, the analysis is currently based on a change in noise variables, and not on project parameters. Thus, a quality function is calculated, which depends on the noise variables. With a reliable analysis, you can check whether the molding process provides stable results under the influence of total noise of various parameters.

Noise variables for reliable analysis.

Input diagram of noise variables for reliable analysis.

Reliable process window in robust analysis.

Illustration. 2 Metal products are stamped.

Reliable analysis allows you to determine a stable and capable process.

If the effects and sensitivity of the noise variables are known, the shaping process can be designed accordingly:

Noise does not affect the desired quality of the result.

Nominal marriages are minimized while production efficiency is improved.

Tolerance limits for material quality control can be determined.

The result is used to predict the stability and capability of molding processes depending on the selected noise variables. Reliable analysis allows the user to identify a reliable process window that takes into account the best formation conditions, taking into account the noise variables.

Solving the stamping stability problem is very important because potential stamping problems can be solved at an earlier stage of the car development cycle, which saves more time and resources. This means faster entry into the new car model market, which has clear advantages.

II. RECOMMENDATIONS

The geometric objects created in NX are divided into surface and solid objects. One of the smaller types of solid body is the sheet metal parts model, which offers several special NX applications to create it. Rigid modeling is the creation of a closed geometric dimension that describes the geometry of the part. To do this, the logical operations of primitives, structural elements, and connecting bodies obtained by elongating and rotating flat contours are used. There is no explicitly expressed solid-state modeling module in NX, since tools from different applications are used for this. In particular, solids can be obtained by giving the thickness of the surface to the shape created in the Studio application, or by filling a closed loop from the surfaces.

The main purpose of solid modeling is to create a clear geometric image of the projected part, which will be the basis for document production, calculation, and CNC programming. From the point of view of the system, the geometric representation is the result of a connected sequence of operations that make up the model building tree. The user's job is to add operations to the construction tree that create certain structural elements or modify the geometry. This is true that for a classic modeling case with a build history. NX also supports modeling without a build history, which will be discussed in a

separate chapter. This chapter will provide an overview of the basic tools for creating solid models in modeling with a history of construction.

To create models, you can use the usual structural elements or create objects based on two-dimensional contours, as well as combine these two methods. Sketches are the basis for all objects obtained by rotating or weighing along a path.

Progressive stamping

Progressive stamping is a metal forming process that is widely used to produce parts for various industries such as automotive, electronics and home appliances. Progressive stamping consists of several separate workstations, each of which performs one or more different operations on the part. A portion is transferred from station to station along the backup line and cut from the line in the final operation.

Progressive stamping - from steel strips to finished parts

In a few operations with progressive stamping, the steel strip becomes the finished part.

The decision to make a progressive or transfer early part depends on the size, complexity, and volume of production. Progressive stamping is used to produce a large number of parts and keep costs to a minimum. The highest requirements for accuracy and durability must be met.

Because of the complexity of progressive molds, it is important to consider all factors that contribute to the desired part quality, including the condition of the workpiece, the pilots, the boundaries of the workpiece, and the deformation of the elongated tape.

Pilots play an important role in progressive stamping - they set the line in the correct position and control it. In addition, they are necessary for the precise positioning of the sheet during drawing operations on the instrument closing and transfer matrices. Other factors to consider are the timing and interaction of the handles, cushions, and top and bottom tools. The advantages of progressive stamping are increased productivity and significantly reduced costs in large-scale production.

III. EXPERIMENTAL RESULTS

The joint venture, established in the Republic of Uzbekistan in 2012, uses progressive templates using CAD / CAM / CAE systems operated by VENKOM AIR ENGINEERING. Advanced technology presses with advanced technology The use of advanced technology in production technology requires the production of molds, improvement of molds, improving the quality of parts, shelf life and prolonging the service life of the work surface. VENKOM AIR ENGINEERING uses mold processing technology. The quality of the printing plates determines the accuracy of the parts. Mold making is a complex process. Therefore, the working part of the mold is in great demand. Preparation of the mold is carried out in several stages. First, the mold paper is prepared. After stamping, the desired mold part is removed and the work surface is heat treated. Heat treatment also requires great care.

Progressive molds require the formation of consistent surfaces. This process also requires a lot of work. The geometric dimensions of the parts are taken into account. SAM systems help us in the project. CAM systems create a virtual environment that helps to create templates and create complex notebook surfaces. CAM systems are designed by NX to extend the service life of progressive molds manufactured by VENKOM AIR ENGINEERING to predict errors in manufacturing processes. Defects in progressive printing forms are solved and solved in a virtual environment.

As an example, we can understand the appearance of mold. VENKOM AIR ENGINEERING has led to significant labor savings. The stages of development of CAM systems in the region are developing rapidly.

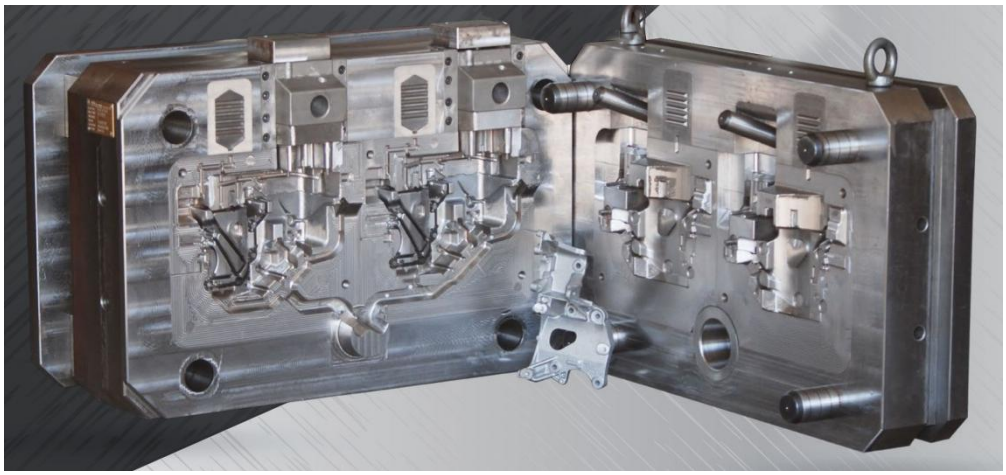

Illustration. 2. Develop mold parts for management applications at NX CAM.

REFERENCES

[1]. Автоматизация проектирования технологии в машиностроении Б. Е. Челищев, И. В. Боброва, А. Гонсалес-Сабатер; Под ред. Акад. Н. Г. Бруевича.-М.: Машиностроение, 1987.-264 с.-(Гибкие производственные системы).

[2]. Барун В. А. Станки с программным управлением и программирование обработки/В. А. Барун, А. А. Будинский.-Л.: Машиностроение, 1694.-348 с.

[3]. Борисов Е. И. Обработка корпусных деталей на многоцелевых станках с программным управлением/Е. И. Борисов.-М.: Машиностроение, 1976.-64 с.

[4]. Быков А. ADEM-VX-на острие атаки//АЛТ(САПР) и графика. 2007.-№5.

[5]. Файзиматов Ш.Н., Гафуров А.М. Support of Software Projects at Local Industrial Enterprises., International Journal of Advanced Research in Science, Engineering and Technology Vol. 6, Issue 12, December 2019.

[6]. Файзиматов Ш.Н., С.Б.Булгаков., Гафуров А.М. Ways to increase stability of stamps in improving working designs. Tashkent state Technical University named after Islam Karimov, Technical Science and Innovation, Tashkent 2021, №3(09)/2021.

[7]. Файзиматов Ш.Н., Гафуров А.М. РДБ дастгохларида мураккаб сиртларни кўп координатали фрезалаш самарадорлигини ошириш истиқболлари. AndMI.MITJ №1. 01.08.2020 y.

[8]. Файзиматов Ш.Н., Гафуров А.М. Improving the productivity of methods for processingshaped surfaces. Наманган мухандислик-қурилиш Институти «Механика ва технология илмий журнали» 2021 йил. №2, 104-110 бетлар.

[9]. Файзиматов Ш.Н., Гафуров А.М. The importance of CAD/CAM/CAE application development. Наманган мухандислик-қурилиш Институти «Механика ва технология илмий журнали» 2021 йил. №2, 110-116 бетлар.

[10]. Файзиматов Ш.Н., Гафуров А.М. The importance of using software projects. ФарПИ “Иқтидорлиталабалар, магистрантлар, докторантларвамустақилизланувчилар” Online Илмий-амалий 2020 йил. 16-17-ноябрь, 7-13 бетлар.

[11]. Файзиматов Ш.Н., Гафуров А.М. Support of software projects at local industrial enterprises. ФарПИ “Иқтидорлиталабалар, магистрантлар,

докторантларвамустақилизланувчилар” Online Илмий-амалий 2020 йил. 16-17-ноябрь, 13-26 бетлар.

[12]. Файзиматов Ш.Н., Гафуров А.М. Methodology of using software projects. ФарПИ “Иқтидорлиталабалар, магистрантлар, докторантларвамустақилизланувчилар” Online Илмий-амалий 2020 йил. 16-17-ноябрь, 26-34 бетлар.

[13]. Файзиматов Ш.Н., Гафуров А.М. РДБ дастгохларида мураккаб сиртларни кўп координатали фрезалаш самарадорлигини ошириш. ФарПИ “Иқтидорлиталабалар, магистрантлар, докторантларвамустақилизланувчилар” Online Илмий-амалий 2020 йил. 16-17-ноябрь, 34-41 бетлар.

[14]. Файзиматов Ш.Н., Гафуров А.М. Кўп координатали РДБ фрезалаш дастгохларида мураккаб сиртларга ишлов бериш самарадорлигини ошириш. ФарПИ “Иқтидорлиталабалар, магистрантлар, докторантларвамустақилизланувчилар” Online Илмий-амалий 2020 йил. 16-17-ноябрь, 41-47 бетлар.

[15]. Гафуров А.М. Машинасозликда мураккаб шаклдор юзаларга механик ишлов беришнинг унумдорлигини ошириш. НМҚИ "Машинасозликда инновациялар, энергиятежамкор технологиялар ва ресурслардан фойдаланиш самарадорлигини ошириш" мавзусида Халқаро миқёсдаги илмий-амалий конференция материаллари тўплами 1-қисм Наманган шаҳри 28-29 май 2021 йил 27-29 бетлар.

[16]. Файзиматов Ш.Н., Гафуров А.М. Methods of processing on machine-building shaped surfaces. НМҚИ "Машинасозликда инновациялар, энергиятежамкор технологиялар ва ресурслардан фойдаланиш самарадорлигини ошириш" мавзусида Халқаро миқёсдаги илмий-амалий конференция материаллари тўплами 1-қисм Наманган шаҳри 28-29 май 2021 йил 96-103 бетлар.

[17]. Файзиматов Ш.Н., Маткаримов Б.Б.., Гафуров А.М. Инновационные технологии литъя (литье по газофицируемым моделям). ТДТУ "Қуймакорлик ишлаб чиқариш сохасида ресурс ва энергиятежамкор инновацион технологиялар" мавзусида халқаро миқёсидаги илмий ва илмий-техник анжуман

13-15 апрел, 2021 йил. Тошкент.

[18]. Файзиматов Ш.Н., Маткаримов Б.Б.., Гафуров А.М. Инновационные технологии литъя (литье по газофицируемым моделям). ТДТУ "Технологии получения пенополистирольных моделей" мавзусида халқаро миқёсидаги илмий ва илмий-техник анжуман 13-15 апрел, 2021 йил. Тошкент.

[19]. Файзиматов Ш.Н., Гафуров А.М.. идр. THE IMPORTANCE OF AUTOMATION IN THE DESIGN OF SHAPED SURFACES //Scientific progress. – 2021. – Т. 2. – №. 6.

[20]. Mamadjanov, A. M., Yusupov, S. M., & Sadirov, S. (2021). ADVANTAGES AND THE FUTURE OF CNC MACHINES. Scientific progress, 2(1), 1638-1647.

[21]. Mamadjanov, A. M., & Sadirov, S. (2021). Analysis of design errors in mechanical engineering. Scientific progress, 2(1), 1648-1654.

[22]. “Automated design systems in local manufacturing plants” Innovative achievements in science 2021*: a collection scientific works of the International scientific conference (9th November, 2021) – Chelyabinsk, Russia : "CESS", 2021. Part 3, Issue 1 – 105-112 p.*

[23]. “Methods of processing of complex surface parts using automated design systems”Formation of psychology and pedagogy as interdisciplinary sciences: a collection scientific works of the International scientific conference (13 November, 2021). ISSUE 3 – 251-258 p.

[24]. “Equilibrium of general processing error during mill machines on rdb machines according to cutting modes.” Pedagogical sciences and teaching methods: a collection scientific works of the International scientific conference (15 November, 2021)-Copenhagen:2021. ISSUE-7 – 422-427 p.

Progressive press formsprogramming:

N0010 G40 G17 G90 G70	N0700 X.4582
N0020 G91 G28 Z0.0	N0710 X.7104
N0030 T01 M06	N0720 X.7183
N0040 T00	N0730 Z2.0327
N0050 G00 G90 Y0.0 Z4.277 S678 M03	N0740 G01 X.671 F24.8
N0060 G43 X1.1787 H00	N0750 X.6656 Z1.9291 F17.7
N0070 Z3.8421	N0760 X.671 F29.8
N0080 X1.0512	N0770 G00 Z1.9625
N0090 G01 X1.0039 F7.8 M08	N0780 X.7044
N0100 X-.0472 F5.4	N0790 Z4.277
N0110 G00 X-.0945	N0800 X1.1787
N0120 Z3.9602	N0810 G91 G28 Z0.0
N0130 X1.0512	N0820 T00 M06
N0140 Z3.7472	N0830 T01
N0150 G01 X1.0039 F7.8	N0840 G00 G90 Y0.0 Z4.277 S648 M03
N0160 X-.0472 F9.	N0850 G43 X1.1787 H00
N0170 G00 X-.0945	N0860 Z2.7704
N0180 Z3.8653	N0870 X.5508
N0190 X1.0512	N0880 G01 X.5429 F40.5
N0200 Z3.6523	N0890 X.3483 F27.4
N0210 G01 X1.0039 F7.8	N0900 G04 P.026
N0220 X-.0472 F9.	N0910 G00 X.3562
N0230 G00 X-.0945	N0920 X.5743
N0240 Z4.277 N0250 X1.1787	N0930 Z2.7822
N0260 G00 Y0.0 Z4.277 S519 M03	N0940 X.4326
N0270 X1.1787	N0950 G01 X.4248 F51.5
N0280 Z3.8177	N0960 G18 G03 X.413 Z2.7704 I-.0118 K0.0
N0290 X.7784	F58.3
N0300 G01 Z3.7704 F22.9	N0970 G00 X.4878

N0310 Z1.9291 F15.3
N0320 X.8858 F25.4
N0330 G00 Z1.9625
N0340 X.9192
N0350 Z3.8177
N0360 X.671
N0370 G01 Z3.7704 F26.6
N0380 Z1.9291 F29.5
N0390 X.7784
N0400 G00 Z1.9625
N0410 X.8118
N0420 Z3.8177
N0430 X.5479
N0440 G01 Z3.7704 F32.5
N0450 Z2.3444 F36.2
N0460 X.671
N0470 G00 Z2.3779
N0480 X.7044
N0490 Z3.8177
N0500 X.4248
N0510 G01 Z3.7704 F42.
N0520 Z2.3444 F46.6
N0530 X.5479
N0540 G00 Z2.3779
N0550 X.5813
N0560 Z2.8558
N0570 X.472
N0580 G01 X.4248 F37.8
N0590 X.4189 Z2.7441 F28.
N0600 X.4248 Z2.7335 F47.3
N0980 X.5508
N0990 Z2.7686
N1000 G01 X.5429 F40.5
N1010 X.3483 F45.6
N1020 G00 Z2.7703
N1030 X.35
N1040 X.5819
N1050 Z2.7568
N1060 X.4326
N1070 G01 X.4248 F51.5
N1080 G02 X.413 Z2.7686 I-.0118 K0.0 F58.3
N1090 G00 X.4208
N1100 Z4.277
N1110 X1.1787
N1120 G00 Y0.0 Z4.277 S648 M03
N1130 X1.1787
N1140 Z2.38
N1150 X.5508
N1160 G01 X.5429 F40.5
N1170 X.3059 F27.4
N1180 G00 X.3138
N1190 X.4326
N1200 Z2.3918
N1210 G01 X.4248 F51.5
N1220 G03 X.413 Z2.38 I-.0118 K0.0 F58.3
N1230 G00 X.4208
N1240 X.5894
N1250 Z2.35
N1260 G01 X.5838 Z2.3444 F37.8

```
N0610 G00 Z2.7669
N0620 X.4582
N0630 X.4641
N0640 X.472
N0650 Z2.4654
N0660 G01 X.4248 F37.8
N0670 X.4184 Z2.3444 F28.
N0680 X.4248 F47.3
N0690 G00 Z2.3779
```

```
N1270 X.3059 F42.4
N1280 P.028
N1290 G00 Z2.3578
N1300 X.3193
N1310 Z4.277
N1320 X1.1787
N1330 M02
%
```