KOLOSNIK MATRITSA MODELINI RAQAMLI USKUNA YORDAMIDA TAYYORLASH KETMA KETLIGINI LOYIHALASH.

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Annotatsiya. Biz kolosnik matritsa modelini raqamli uskuna yordamida tayyorlash ketma ketligini loyihalash. Maqsadimiz toladan ajratilgan chigitlarni arrali tola ajratgich ishchi kamerasidan o‘z vaqtida chikib ketish imkoniyatini yaratib beradigan kolosniklarni ishlab chiqarish. So‘ng ishlab chiqarishga joriy etishdan iborat.

Kalit so‘zlar. Kolosnik, 3d modeli, NX1.2 dasturi, Operation Navigator-Geometry Gut Area, Rest Milling, 50dR5, 16DR0 va 5D25R frezerlar, “Feeds and Speeds”.

РАЗРАБОТКА ПОСЛЕДОВАТЕЛЬНОСТИ ИЗГОТОВЛЕНИЯ МАТРИЧНОЙ МОДЕЛИ КОЛОСНИКА С ИСПОЛЬЗОВАНИЕМ ЦИФРОВОЙ АППАРАТУРЫ.

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Аннотация. Разрабатываем последовательность изготовления колоссальной матричной модели с использованием цифрового оборудования. Нашей целью является производство колонников, позволяющих семенам, отделенным от волокна, своевременно покинуть рабочую камеру сепаратора пиловочника. Затем он состоит во внедрении его в производство.

Ключевые слова. Колосник, 3d модель, программа NX1.2, Навигатор операций-Геометрия области кишки, Остаточное фрезерование, Фрезерные станки 50dR5, 16DR0 и 5D25R, "Подачи и скорости".

DESIGNING THE SEQUENCE OF PREPARATION OF THE KOLOSNIK MATRIX MODEL USING DIGITAL EQUIPMENT

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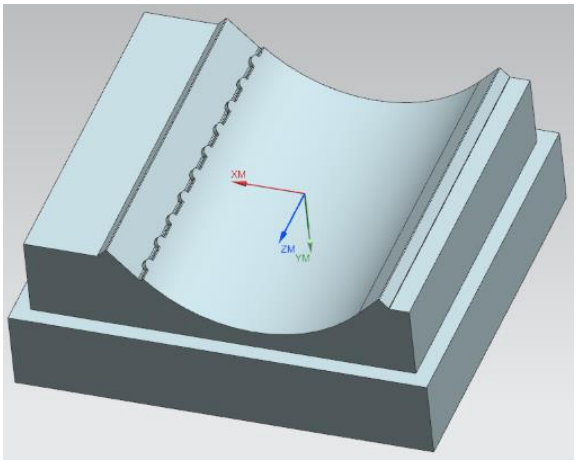
Annotation. We design the sequence of preparation of colossal matrix model using digital equipment. Our goal is to produce colosniks that make it possible for the seeds separated from the fiber to leave the working chamber of the saw fiber separator in time. Then it consists of introducing it into production.

Keywords. Kolosnik, 3d model, NX1.2 software, Operation Navigator-Geometry Gut Area, Rest Milling, 50dR5, 16DR0 and 5D25R milling machines, "Feeds and Speeds".

Kirish. Hozirgi kunda paxta tozalash korxonalarida ishlab chiqarilayotgan paxta tolasining sifati bevosita texnologik jarayonda ishlayotgan mashinalarning samarali ishlashiga bog‘liq[1]. Xar bir texnologik jarayon sifatli tola ishlab chikarish uchun u yoki bu darajada muxim axamiyat kasb etadi. Korxonada tola ishlab chiqarishga asosiy bog‘liq jarayon - bu jinlash (toladan chigitni ajratish) jarayonidir. Tozalash tsexlarida mayda va yirik iflosliklardan tozalangan paxtani jinlash tsexining asosiy mashinasi bo‘lgan arrali jinga uzatiladi[2]. Jinning ishchi kamerasiga kelib tushgan chigitli paxtaning chigit tarog‘i yonida aylanayotgan arra tishlari bilan ilib olib, kolosnikli panjaraga olib keladi. Ishchi kamerada arra tishlariga ilashgan paxta bo‘lakchalari boshqa paxta bo‘lakchalariga ilashib, ularni xam tortadi va xomashyo valigini xosil qiladi. Bu xomashyo valigi arrali tsilindrni aylanishiga qarshi tomonga aylanadi va u arra tishlarini paxta tolasi bilan uzluksiz ta’minlab turadi[3-4].

Maqola mualliflari tomonidan jin mashinasi ishchi elementlarini takomillashtirgan xolda bir qancha tadqiqotlar o‘tkazildi. Tadqiqotlardan maqsad, Kolosnik matritsa modelini raqamli uskuna yordamida tayyorlash ketma ketligini loyihalash. Kolosnikni samarali ishlaydigan texnologik o‘lchamlarini aniqlash xamda ishlab chiqarishga joriy etishdan iborat[5].

Optimallashda asosiy masala jin mashinasi ish unumdorligiga ta’sir etuvchi axamiyatli omillarni aniqlab olishdir, bunda jin mashinasining asosiy ishchi qismlaridan biri bo‘lgan “kolosnik”ni raqamli uskuna yordamida turli xil turini tayyorlab eng yahshi parametrlar tanlab olinadi[6-7]. 3D holatdagi puansonni biz qanday qilib raqamli uskuna tayyorlaymiz(rasm-1)? Bu murakkab juda qiziqarli jarayondir. Birinchi navbatda kerakli materiallarni tayyorlaymiz[8-9].



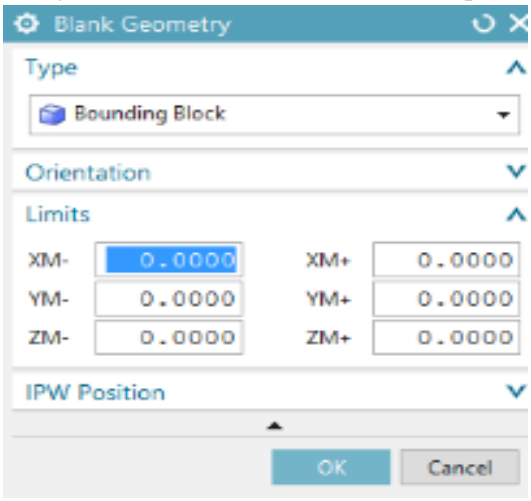
Rasm-1: Kolosnik matritsa modeli.

“Ctrl+Alt+M” tugmalarini bosib biz “modeling” dan “Manufacturing”ga o‘tamiz. Matritsa modelini raqamli uskunada tayyorlash uchun uni turli frezerlar yordamida tayyorlash va ketma-ketligini loyihalsh[10-11].

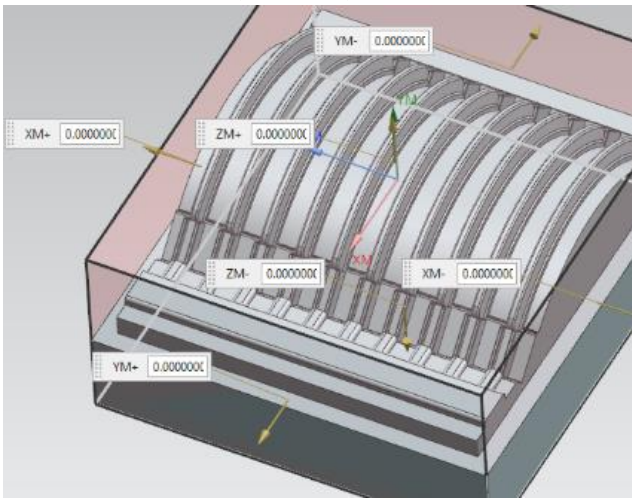
Matritsa modelini raqamli uskunada tayyorlash uchun avval matiriallar tanlanadi.

Minimal qo‘yim	**Maksimal qo‘yim**
2Zimin = (Rz-h)i-1 +ΔEi 1 + Eyi (Rz-h)i-1 =500mk (CTMI -182-6) $\Delta k=1\frac{мкм}{мм}$ (CTMI -183-8) ΔEi-1 =Δk l = 1*240=240 мкм	2Zimax= Zimin +TDi-1-TDi TDi-1 = 1500 мкм (CTMI -120-3) TDi = 100 мкм (CTMI -7-2) 2Zimax = 840+1500-100=2240 мкм = 2.2 mm
$Eyi=\sqrt{E_б{}^2 + E_m{}^2} = \sqrt{0^2 + 100^2} = 100мкм$ Eб =0 ; Em = 100 2Zimin = 2[500+240+100] = 840 мкм (CTMI -43-14)	

Operation Navigator “Blank Geometry” orqali abrabotka qilish jarayonini loyihalaymiz(rasm-2). Kolosnikni qolibini yuzasi tanlanadi(rasm-3).

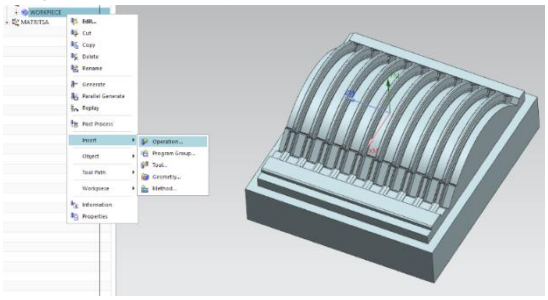


Rasm-2: “Blank Geometry”

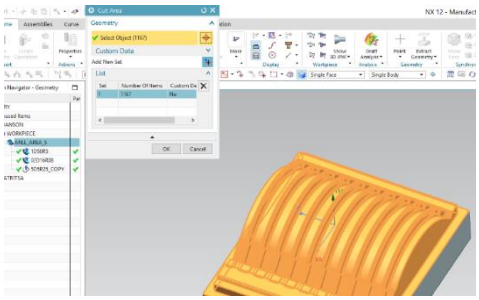


Rasm-3: Kolosnik qolibi.

Opereshin oraqali biz frezlar orqali abrabotka qilish jarayonini loyihalaymiz (rasm-4). Operation Navigator-Geometry “Gut Area” orqali abrabotka qilish jarayoni(rasm-5).

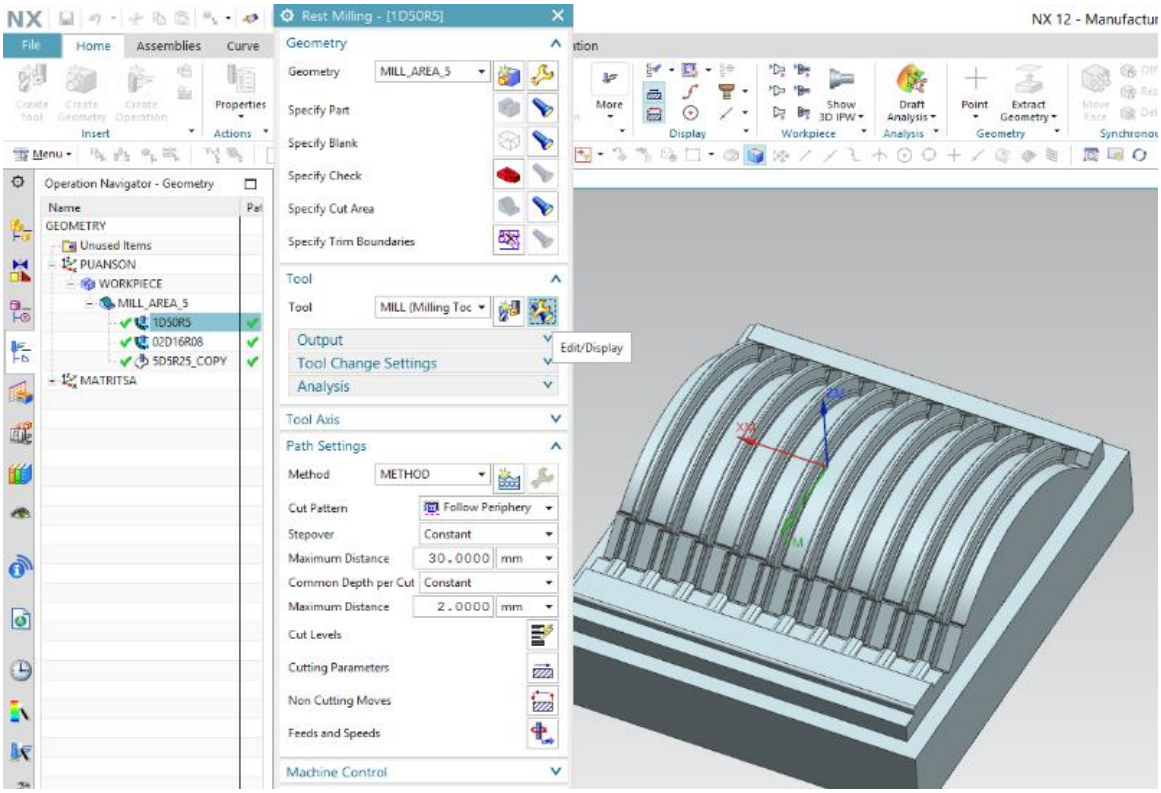


rasm-4: frezerlar orqali abrabotka qilish jarayoni.



Rasm-5: “Gut Area”

Operation Navigator-Geometry “Rest Milling” orqali abrabotka qilish jarayoni(rasm-6).



rasm-6: Rest Milling.

Biz 3 xil frezer yordamida puanson modelini tayyor holaga olib kela olar ekanmi. Bula 50dR5 pobeditli frez, 16DR0,8 li pobeditli frez va 5D2,5R li radiusli frezlardir[12].

50D5R li pobetitli freezer

16D0.8Rli pobeditli freezer

5D2.5R li radiusli frezer

Birinchi programmamiz 50D5R orqali amalga oshiriladi, unga moslab programma yaratamiz[13].

Frezalash . 6H11 vertukal frezalash uchun kesish rejimi.

1. Kesish chuqurligi t= Zimax= 2.2mm

2. Surish Sz = 0.1 mm (CTMII – 283 -33)

3. Kesish tezligi $V = \frac{CvDa}{T^m * t^x * S^y * B^u * Z^p} K_v \frac{m}{min}$

$C_v = 332;\ x = 0.1\ ;\ y = 0.4;\ u = 0.2\ ; a = 0.2\ ; P = 0\ ;\ m = 0.2$ (CTMII – 286 – 39)

T – 240 minut (CTMII -290 – 40)

$$K_v = K_{mv} \cdot K_{nv} \cdot K_{uv} = 1 * 1 * 1 = 0.5$$

$$K_{mv} = 1 \ (CTMII - 261 - 1)$$

$$K_{nv} = 1 \ (CTMII - 263 - 5)$$

$$K_{uv} = 1 \ (CTMII - 263 - 6)$$

$$V = \frac{332 * 250^{0.2}}{240^{0.2} \cdot 2.2^{0.1} \cdot 0.1^{0.4} * 240^{0.2} * 14^{0}} 1 = \frac{332 * 3.02}{2.99 * 1.08 * 0.4 * 2.99 * 1} = \frac{1002.64}{3.86} 1 = 259.8 \frac{m}{min}$$

4- Shpindelning Aylanishlar soni

$$N = \frac{1000 * V}{\pi * D} = \frac{1000 * 259.8}{3.14 * 240} = \frac{259800}{753.6} = 344.74 \frac{ayl}{min}$$

Dastgohning imkoniyatidan kelib chiqib

$n_x = 315 ayl/min$ deb qabul qilamiz.

5. xaqiqiy kesish tezligi

$$V_x \frac{\Pi D n x}{1000} = \frac{3.14 * 250 * 315}{1000} = 237.38 \frac{m}{min}$$

6- Kesish kuchuni xisoblaymiz.

$$P_z = \frac{10 C_p * t^x * S_z^y * B^u * Z}{D^a * n_x^w} K_{mp} \ н$$

$C_p = 825;\ x = 1\ ; y = 0.75\ ; u = 1.1\ ; a = 1.3; w = 1.2;$ (CTMII – 291 – 41)

Kmp=1 (CTMII – 264 – 9)

$$P_z = \frac{10 * 825 * 2.2^1 * 0.1^{0.75} * 240^{1.1} * 14}{240^{1.3} * 315^{0.2}} * 1 =$$

$$= \frac{8250 * 2.2 * 0.178 * 415.18 * 14}{1242.4 * 3.16} * 1 = \frac{18778508.36}{39259.84} =$$

$$= 4783.14 \ н$$

7- Burovchi moment

$$M_{bp} = \frac{P_z * D}{2 * 100} = \frac{4783.14 * 250}{200} = 5978.9 \ нм$$

8- Kesish quvvatini xisoblash

$$N = \frac{P_z * V_x}{1020 * 60} = \frac{4783.14 * 277.38}{61200} = 18.55 \ kvt$$

9- Asosiy kesish vaqti

$$T_a = \frac{l}{S * n} = \frac{260}{0.1 * 315} = 8.25 \ min$$

2 – o‘tish . 25.3 mm qattiqlikni saqlab A sirtni frezalash . 1- va 2- o‘tishlar bir xil bo‘lgani uchun qiymatlarni yozamiz.

1. Kesish chuqurligi t= Zimax= 2.2mm

2. Surish Sz = 0.1 mm (CTMII – 283 -33)

3. Kesish tezligi $V = \frac{CvDa}{T^m * t^x * S^y * B^u * Z^p} K_v \frac{m}{min}$

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$C_p = 825;\ x = 1\ ; y = 0.75\ ; u = 1.1\ ; a = 1.3; w = 1.2;\ (CTMII - 291 - 41)$

Kmp=1 $(CTMII - 264 - 9)$

$$P_z = \frac{10 * 825 * 2.2^1 * 0.1^{0.75} * 240^{1.1} * 14}{240^{1.3} * 315^{0.2}} * 1 =$$

$$= \frac{8250 * 2.2 * 0.178 * 415.18 * 14}{1242.4 * 3.16} * 1 = \frac{18778508.36}{39259.84} =$$

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7- Burovchi moment

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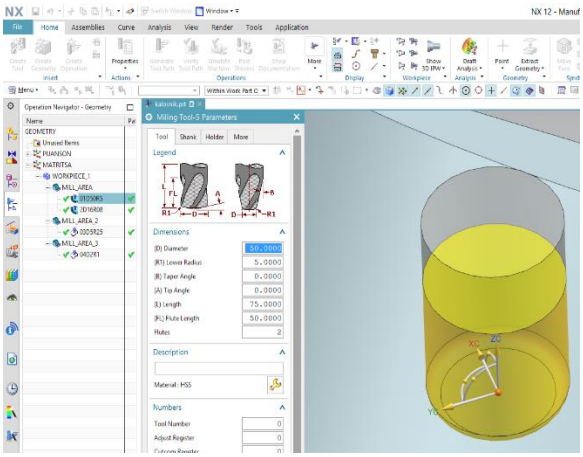
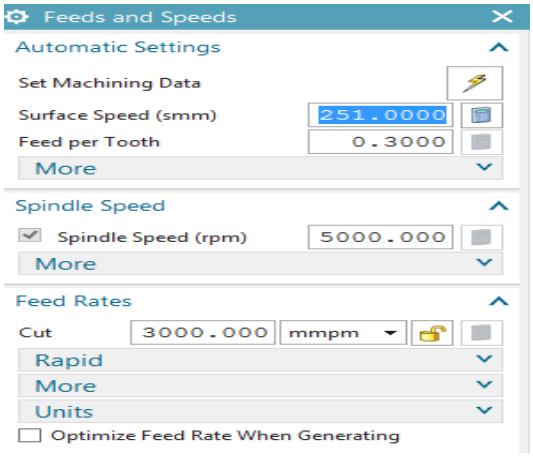
9- Asosiy kesish vaqti

$$T_a = \frac{l}{S * n} = \frac{260}{0.1 * 315} = 8.25\ min$$

Operation Navigator-Geometry “Milling Tol-5 Parameters” orqali abrabotka qilish jarayoni(rasm-7). 01D50RS li frezimiz ishi. “Feeds and Speeds” buyrigi orqali tezlik beramiz frezir aylanishi 5000 ayl/min, harakatlanish tezligi 3000mm/min ga teng(rasm-8).

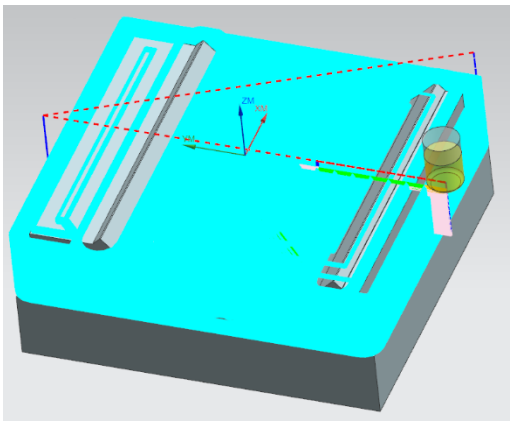


Rasm-7: “Milling Tol-5 Parameters”

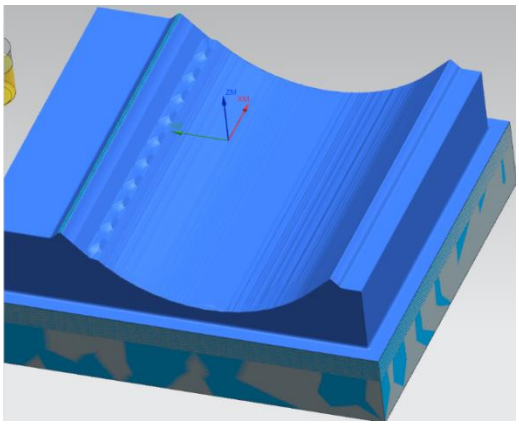


Rasm-8: “Feeds and Speeds”

50D5R li frezerimiz ishni yakunlagach to‘plangan matiriallarimiz quyudagi holatda bo‘ladi(rasm-8, rasm-9):



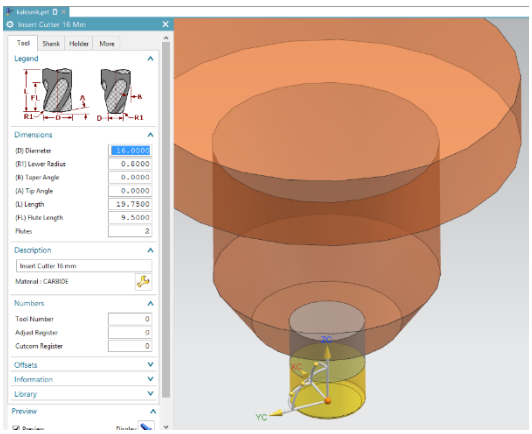
Rasm-8: 50D5R li frezer ishni



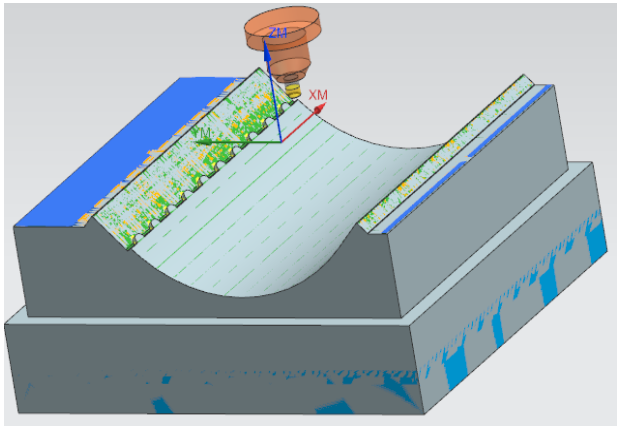
Rasm-9: 50D5R li frezer ishni

Biz bu ishni ya’ni programmani 1D50R5 nomi bilan saqlab qo‘yamiz[14]. Dasturning ish vaqti 4 soat 11 min ni tashkil etadi.

Endi 16D0,8R li frezerda amalga oshiriladi(rasm-10). 16D0,8R li ferer ishini yakunlagandan keyin zagatovkamiz quyidagi holatga keladi(rasm-11):

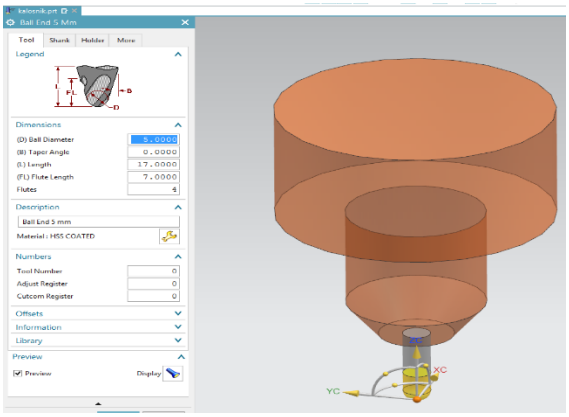


Rasm-10: 16D0,8R li frezer

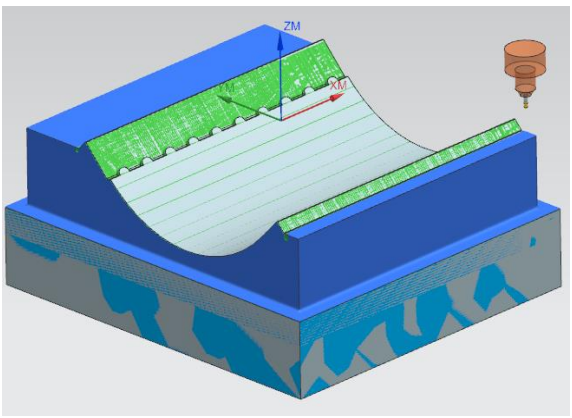


Rasm-11:16D0,8R li frezer ishini yakuni

Bunga ham tezlik beramiz biz DSP xom ashyosidan zagotovka olganimiz uchun bizga katta tezlik bilan ishlash imkoni balandroq. Ya'ni biz frezer tezligini qanchalik baland bersak ham dastgohimizga va frezerimizga unchalik ziyon yetmaydi va biznig puanson tayyorlash jarayonimiz shunchalik tez amalga oshiriladi[15]. Biz frezer aylanish tezligini 5000 ayl/in va harakat tezligini 2000mm/min deb beramiz. Dastur nomini 2D16R08 deb saqlaymiz. Dastur vaqti 14 soat 28 minut ni tashkil etmoqada. Keyingi ishimiz 5D2,5R li frezer(rasm-12)da amalga oshiriladi va bunda zagatovkamiz deyarli tayyor matritsa modeli holatiga keladi(rasm-13).



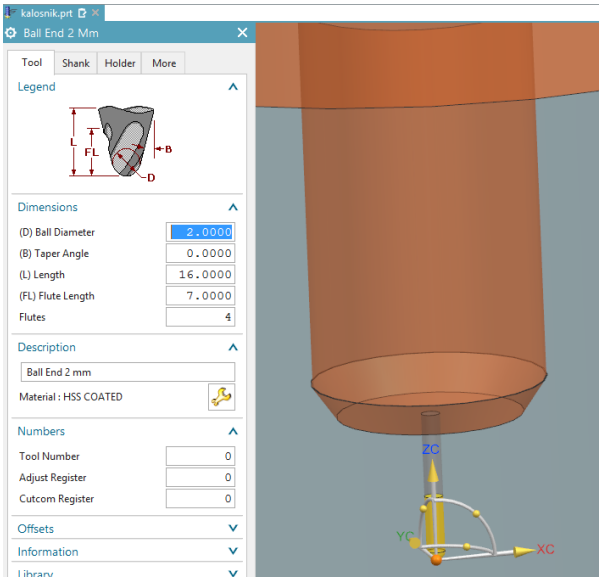
Rasm-12: 5D2,5R li frezer.



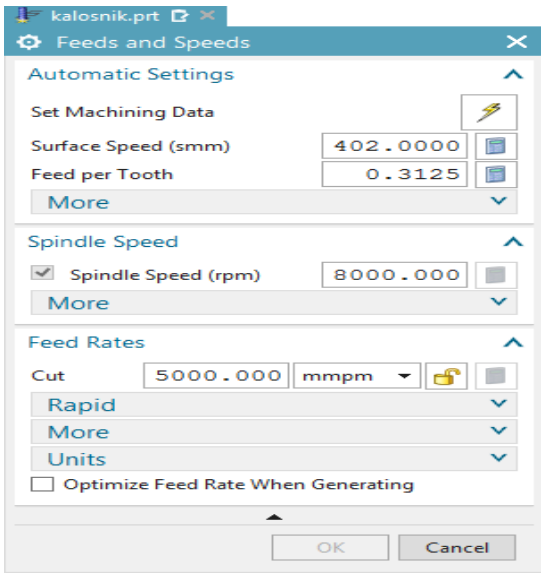
Rasm-13: Matritsa modeli holati.

Frezerni aylanish tezligi 8000aylana/min va harakat tezligi 3000 mm/min deb belgilaymiz. Bu programmani 3D5R2,5 deb saqlaymiz.

Oxirgi yakuniy dasturimiz mayda frezerda amalga oshiriladi ya'ni 2D1R li frezerda(rasm-14). Freezer aylanish tezligi 8000ayl/min, harakat tezligi 5000 mm/min deb belgilaymiz(rasm-15).



Rasm-14: 2D1R li frezer.



Rasm-15: Freezer aylanish tezligi.

Dasturimiz ish soati 3 min 3 soniyani tashkil etadi.

Xulosa:

Maqsad, Kolosnik matritsa modelini raqamli uskuna yordamida tayyorlash ketma ketligini loyihalash yo‘li bilan toladan ajratilgan chigitlarni arrali tola ajratgich ishchi kamerasidan o‘z vaqtida chikib ketish imkoniyatini yaratib berish. Samarali ishlaydigan kolosniklarni ishlab chiqarishga joriy etishdan iborat.

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