O’ZBEKISTON RESPUBLIKASI

OLIY VA O’RTA MAXSUS TALIM VAZIRLIGI

TOSHKENT AVTOMOBIL YO’LLARI INSTITUTI

”AVTOMEXANIKA FAKULTETI”

“Yol qurilish mashinalar” kafedrasi

DAK raisi	Kafedra mudiri
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“_____” “_____” 2014 yil	“_____” “_____” 2014 yil

BITIRUV MALAKAVIY ISH

Mavzu: SD 23 Buldozer otvalini Solid Edge ST dasturiy kompleks yordamida loyixalab ANSYS dasturi kompleksi yordamida mustaxkamlikka va a xisoblash.

Talim yo’nalishi: 5521100 – Yer usti transport tizimlari

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Mundarija

Kirish

Mamlakat iqtisodietining jadal suratlar bilan rivojlanib borishi iqtisodiyot uchun eng zarur infrastruktura tarmogi - transport kommunikastiyalarini, jumladan, avtomobil yo'llarini qurilishi va rivojlanishini talab etadi. Yo'l inshootlarining qurilishi, albatta, poydevor bo'lmish, er ishlaridan boshlanadi. Avtomobil yo'llarini qurish, ta'mirlash va foydalanishda er qazish va yo'l qurilish mashinalari bo'yicha etuk mutaxassislarni tayyorlash muxim axamiyat kasb etadi. «yer qazish va yo'l qurilish mashinalari tuzilishi va nazariyasi» fanining o'qitilishi er qazish va yo'l qurilish mashinalarini yaratish va ulardan foydalanish sohasida faoliyat ko'rsatuvchi bo'lajak mutaxassislarni yo'l qurilishi mashinalarining tuzilishi, ishlash jaraeni, nazariy asoslari bo'yicha bilim va ko'nikmalar egallashlarini ta'minlaydi.

Gusinistali yoki gildirakli traktor, tyaga yoxud boshka uzi yurar mashinaga rama yoki bruslar yordamida yurish kismi bazasidan tashkariga joylashgan ish organi kiyshik profili osilgan uzi yurar er kazish mashinisi bul’dozer deb ataladi. Kupincha otval kiyshik otval yuzasi bilan bazaviy mashinada tashkariga qaratib o’rnatiladi, uning eni mashina gabaritiga teng keladi. Buldozerdan erni katlamlab kazish, er tekislash xamda yul kanal, damba, kotlovan va boshka kurilish, gidrotexnikaviy irrigastiya tuprok inshootlarini kurilish va remont kilishda grunt, foydali kazilmalar, ruda, kurilish materiallari va boshkalarni 60-150 m masofaga surishda foydalaniladi.

Gruntni bul’dozer yordamida iktisodiy jixatdan samaraliy surish masofasi uning tortish klassi, turi va

gruntning kattikligi xamda ishlash sharoitiga boglik. Odatda bu masofa 60 m dan oshmaydi.

Bul’dozerlar vazifasiga karab umumiy ishlarga va maxsus kalarga muljallangan bul’dozerlarga bulinadi.

Umumiy ishlarga muljallangan bul’dozerlar kuprok uchraydigan urtacha gruntli va iklimli sharoitlarda grunt xamda materiallarni katlamlab kirkish, tuplash va surish ishlarini bajaradi. Bunday urtacha sharoitlarga oddiy kumlok, kumok va loyli grunlar xamda ularning xar xil turlari, yorilgan slanestlar oxaktosh, oxakgil turidagi engil koya jinslari, kuprok uchraydigan iklim sharoitlariga esa 40 dan +40^{o}S gayaa temperatura mu’tadil iklimli sharoitlar kiradi.

Maxsus bul’dozerlar ayrim ish turlarini (masalan, yul va boshlangich yullarni kurish, torfni tudalash kavel’erlarni tekislash, materiallarni er ostida ishlash) yoki ishlarni aloxida iklimli sharoitlarda (masalan, minus 60 li sovukda, tropik namlikda va 60^{o}S gacha issikda) bajarishga muljallangan buladi.

Maxsus bul’dozerlarda ayrim ishlarni bajarishda xar xil tipdagi otvallardan foydalaniladi: kessak va sochiluvchan materiallar Bilan ishlashga muljallangan, bir-biriga nisbatan 15^{o} burchak ostida urnatilgan, 3-5 kisimdan tuzilgan sferik

otvallar sochiluvchan materiallarni uzok masofaga surish uchun jagli gidravlik boshkariladigan kamrovchi otval; oldinga va ketinga yurib ishlash uchun ikki yuzli otval bul’dozerchi tomonga va bul’dozerchidan teskariga ishlaydigan burilma otvallar.

Ishlash soxasini kengaytirish maksadida umumiy ishlarga muljallangan bul’dozerlar va maxsus bul’dozerlar tez olib kuyiladigan, almashtiriladigan kuydagi kushimcha jixozlar: yumshatish tishlari, kiya olgichlar, ochgichlar, kengaytirgichlar, uzaytirgichlar, arik ochgichlar, changlar, panshaxlar, butun kirkgichlar, va boshkalar bilan ta’minlanadi:



Yurish kismi buyicha bul’dozerlar gusinistali va gildrakli buladi. Mominaltortish kuchi buyicha bul’dozerlar nominal tortish kuchi 30 (kuvvati 400 o.k. dan) ortik bulgan urta ogir, tortish kuchi 20 dan 30 gacha (250-400 o.k.) ogir tortish kuchi 3,5 dan 20 gacha (160-249 o.k.) urta, tortish kuchi 2,5 tk dan (60 o.k.dan) kam kichk gabaritli bul’dozerlarga bulinadi. Bul’dozerlar konstruktiv belgilari buyicha: otval mashinaning buylama ukiga perpendekulyar urnatilgan va planda burila olmaydigan; otval mashinaning buylama ukidan ikki tomonga burchak ostida yoki unga perpendekulyar urnatiladigan, otval buriladigan (yoki bul’dozerlar); ikki bulakdan tuzilib, sharnirli brikgan aloxida yoki birgalikda mashinaning buylama ukiga burchak ostida yoki perpendekulyar kilib gorizontal tekislikda urnatiladigan unversal otvalli (yul kurgichlar) tiplariga ajratiladi.

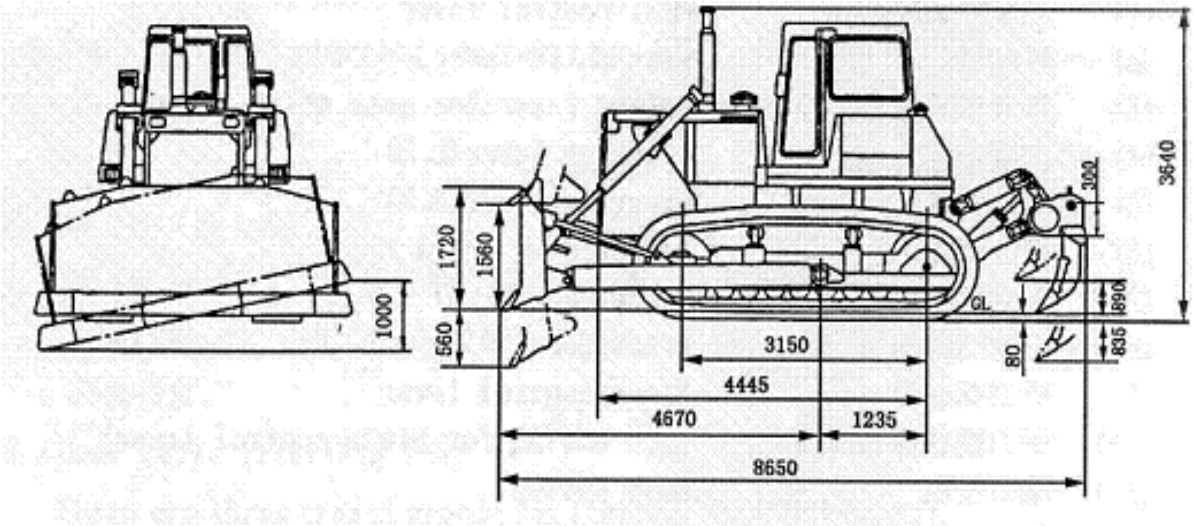
Bul’dozerlarning barcha tipdagi otvallari ogir grunt va materiallarini ishlashini birlashtirish uchun kundalang tekislikda kiyalatish mexanizimiga ega bulishi mumkun. Bul’dozerlar boshkarish mexanizimi tipiga gidravlik va kanat blokli boshkariladigan bul’dozerlga bulinadi.

Xalk xujaligida umumiy ishlarga muljallangan gusinistali otvali burilmaydigan bul’dozerlardan kuprok, otvali buriladigan kamrok foydalaniladi 10 tk va undan kuchli traktorlardagi bul’dozerlardan kupincha bir yula yumshatish jixozini osgan xolda foydalaniladi. Xozirda 300 mingdan ortik bul’dozerlar bulib, xar yili 40 mingdan ziyod ishlab chikarilmokda bul’dozerlar ishlab chikarishda kup yillardan buyon surunkasiga dunyoda birinchi urinni egallab kelmokda.

Bul’dozerlar konstrukstiyasi 3,4 (6), (10), (15), va (25) tk tortish klassidan gusinistali traktorlarga urnatilgan bul’dozerlar, 0,9; 3,4; 5 tk tortish klassidagi gildrakli traktorlarga urnatilgan bul’dozerlar seryalab ishlab chikarilmokda. Kelajakda 4 (6), (10), (25) va (35) tk tortish klassidagi endi ishlab chikariladigan TP- 4, T-130, T-220, T-330 va T-500 gusinistali traktorlarga, shuningdek, T-80, T-156 gildrakli traktorlar kuvvati turlicha (1000-1200 o.k gacha) bulgan gildrakli tyagachlarga urnatiladigan bul’dozerlarni ishlab chikarishga tayyorgarlik kurilmokda.

3 tk klassli (T-74 va DT-75 modellar) va 10 tk klassli (T-100 M) gusinistali traktorlarga, shuningdek 1,4 tk klassli (MTZ-52 modelli) gildrakli traktorlarga urnatilgan otvali burilmaydigan bul’dozerlar kup ishlab chikarilgan va ishlab chikarilmokda. MTZ-52 traktori va uning modifikastiyalariga urnatilgan kupchilik bul’dozerlar shu traktor bazasida ishlab chikarilyotgan ekskavatorga kushimcha ish jixozlari sifatida ishlab chikariladi. 10 tk va undan yukori klassli traktorlarga urnatilgan, seryalab ishlab chikarilyotgan barcha bul’dozerlar odatdagi mu’tadil iklimdagi, kabi past temperaturada xam ishlashga moslashtirilgan. Ularning metall konistrukstiyalari sovukda sinmaydigan, kam legirlangan pulatdan tayyorlanadi. Buriladigan otvali bul’dozerlardan 10 tk klassi traktorlar bilan agregatlanadiganlari kuprok tarkalgan. Gildrakli traktor

va tyagachlarga urnatiladigan, buriladigan otvali buldozerlar ishlab chikarilmaydi.



Otvali burilmaydigan bul’dozerlar Gusenistali bul’dozerlar 3 tk T-74 traktoriga urnatilgan gidravlik boshkariladigan DZ-29 bul’dozeri tipaviy konistrukstiyadagi bul’dozer bulib, uning bazasida 3 tk klassli traktorlarga urnatilgan barcha modeldagi bul’dozerlar unifikastiyalangan (33-rasm). Itaruvchi brus 10, koziryok 3, changi 12 va pichok 13 .li otval gidrostilindr 4, kronsheteyn 5 va kundalang balka 9 bul’dozer jixozlarinig asosiy uzellari xisoblanadi.

Otval rupara listi egib payvandlangan kutisimon konistrukstiyadan iborat bulib, rupara list kirkilgan grunt katlamini tuplab yukoriga uzatilishini ta’minlaydi.

Rupara list ketiga kushimcha list bilan uzaro boglangan ikkita listaviy kuti, yukorisiga esa kovurgalar Bilan mustaxkamlangan koziryok payvandlangan. Koziryok kutarilish va siltanishlarda gruntni otvaldan oshib tukilishdan saklaydi. Pichoklar urnatilgan joyda (pastdan) rupara list kovurgalar Bilan puxtalangan.

Otvalga oldindan yashirin klakli boltlar yordamida ikta yonlama va bita urta pichok maxkamlangan. Pichoklar ikta kesish kirrasiga ega, shu sababli ularni eyilganda kayta urnatish mumkin.

Otvalning silama pichoklarida otval yuzasiga yoki unga perpendekulyar maxkamlanadigan ochkichlarga 30^0 burchak ostida urnatiladigan otval kengaytirgichlari 2 ni maxkamlashga muljallangan bir necha teshik bor. Kengaytirgichlarni otval Bilan pogonasiz biriktirish nam gruntlar Bilan ishlaganda ularning yopishmasligiga yordam beradi. Kengaytirgich 2 egilgan rupara list yoki kovurgalardan tuzilgan payvandlangan konistrukstiya shaklida yasalgan. Uning pastiga pichok urnatilgan. Ochkichlar tashki tomondan burchakliklar bilan maxkamlangan.

Otvalning urtasiga, orkasidan kalagiga sharikli podshipnikli podshipnik urnatilgan gidrostilindr shtogi bilan sharnirli briktirish uchun kronteyn payvandlangan.

Kutisimon kundalang kesimli itaruvchi bruslar oldingi uchlari Bilan otvalga payvandlangan. Ularni karama karshi uchlariga termik ishlov berilgan vkladishli vklasimon tutgichlar payvandlangan. Itaruvchi bruslar shu vilkasimon tutkichlar va shtirlar vositasida kundalang balka uchlaridagi stilindrik stapfalar bilan sharnirli birikadi.

Changlardan otvalni erga botishini cheklash zarur bulgan tekislash ishlarida, tosh yullarda ishlaganda va boshka shunga uxshash sharoitlarda ishlarni engillashtirish uchun foydalaniladi. Ular stopor boltlari yordamida bikirlik kutilari teshiklarga maxkamlangan vertikal stilindrik stoykalarga urnatilgan bulib, bu bikirlik kutilari itaruvchi bruslarning otval bilan birikkan joyini mustaxkamlaydi.. tarelka shaklida changilar stoykalar Bilan sharnirli birikkan. Ularning xolatini

balandlik buyicha teshiklardagi stoykalarni surish vasport boltlarini vositasidp fiksastiyalash Bilan rostlash mumkin. Ularning joylashish balandligi, odatda, pichoklarning kesish kirralari satxida yoki undan bir oz (1-2sm) pastrok tanlanadi.

Kesimi tropestiyasimon kundalang bal kraning uchlariga kvadrat kallakli stilindrik stapfalar payvandlangan bulib ishlayotgan bu kallaklarga itaruvchi bruslar vilka simon tutkichlar orkasi tayanadi. Kundalang balka traktor urtasiga, uning ramasi lonjeroilariga balkani UK buylab surilishidan saklab turadigan ikkita stremyapka 5 va traktor 7 yordamida maxkamlanadi.

Keyingi yillarda ishlab chikarilgan bu tipdagi bul’dozerlarning bir kismida xar tomondan bittadan stremyanka yordamida maxkamlanadigan kundalang balka bor. Bu bul’dozerlar traktorlari ramalarining lonjeronlari kundalang balka urnatiladigan uyikli parchinlangan kronshteynlar Bilan ta’minlangan.

Ikkiyoklama ishlaydigan gidrostilindr vrsitasida otval kutarilib tushiriladi, zarur vaziyatda va otvalni erkin vaziyat deb ataladigan vaziyatda fiksastiyalaydi, bunda otval ogirlik kuchi ta’sirida pichoklari Bilan grunga tiralgan xolda xar kanday vaziyatni egallash mumkin.

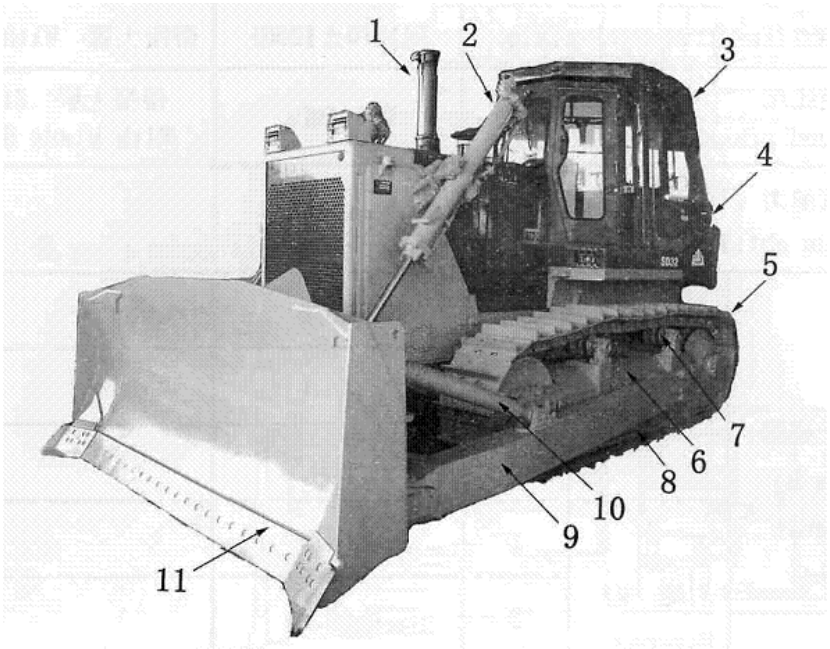
Gidrostilindir kabinadan turib taksimlagich va traktordagi mavjud gidrosistema yordamida boshkariladi, bu gidrosistema gidrostilindr Bilan egashuvchan

shlanglar 6 orkali ulangan Bul’dozer kup yurganda gidrostilindr transport osmasi yordamida bushatilishi mumkin. Bu osma gidrostilindr krnshteyiniga sharnirli maxkamlangan skobadan iborat. Gidrostilindr shtoki Bilan biriktirishga xizmat kiladigan otval kronshteyini ostida otvalning transport xolatida skoba kiygiziladigan chikik bor. Kelajakda otvalni boshkarish uchun ikkita gidrostilindr vositasida boshkarishda mashina massasidan tularok foydalanish muljallanmokda. Gidrostilindr kronshteyn oldida stoyka va urtasida kronshteyini bor poperechina

yordamida biriktirilgan ikta buylama balka shaklida payvandlab yasalgan.buylama balkalarda traklar va traktor ramasi old brusga maxkamlash uchun teshikli plitalar bor. Poperechinadagi kronshteyn gidrostilindirni maxkamlash ramasini urnatish uchun vtulkali teshiklarga ega. Rama Bilan briktirish uchun gidrostilindir gilzasiga ramka teshiklarida suriluvchi vtulkaga kirib turadigan stapfalar payvandlangan.

Цilindirning ramka Bilan va ramkaning kronshteyn bilan sharnirli brikmalar uzaro perpendekulyar tekisliklarga joylashgan bulib, brigalikda gidrostilindrga buylama va kundalang yunalishda tebranish imkonini beruvchi unversal sharnir xosil kiladi. Bunday birikish tufayli gidrostilindrning noanik tayyorlanganligi va otval tushadigan markazlashgan nogruzka okibatida xosil bulish extimoli bulgan kundalang nagruzkalardan xoli buladi. DT-75, DT-75M va DT-75 traktoriga urnatilgan gidravlik boshkariladigan DZ-42, DZ-42A, DZ-100 va DZ-62 bul’dozerlari yukorida bayon etilgan bul’dozerlar Bilan Tula unifikastiyalangan. Ular asosan kundalang balka va gidrostilindr kronsheytening maxkamlanishi, shuningdek, itaruvchi bruslarning otvalga nisbattan joylashish jixatidan fark kiladi. Bunday farklar traktorlar boglanish joylarining xar xilligi tufayli kelib chikadi

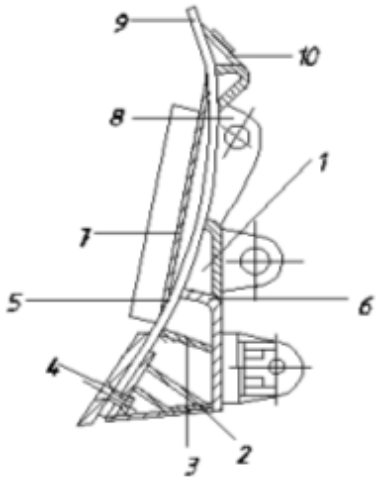
va 4 (6) tk klassli T-4A va T-4AP1 traktoriga urnatilgan gidravlik boshkariladigan DZ-101-1 va DZ-101 bul'dozerlari DZ-54 bul'dozerlari bilan umifikastialangan (pastga karang).



10 tk klassli G-100 MGP traktoriga urnatilgan gidravlik boshkariladigan DZ-54 bul'dozeri (34-rasm) 10 tk klassli gusinistiyali traktorlrning xama tiplariga urnatilgan bul'dozerlar uchun unifikastiyalash bazasi xisoblanadi. Gidrosistema va gidrostilindr 2 bilan jixozlangan bazaviy traktorga tayanch sharnirlar 8 yordamida koziryogi 4, pichogi 5 va itaruvchi brus bulgan otval 3 urnatilgan. Otvalning yukori kismi uning kundalang ogish va kirkish burchagini kichik chegarada uzgartirish imkonini beradigan vintli kashaklar 7 vositasida itaruvchi bruslar bilan birikkan. Itaruvchi bruslar bilan biriktirish uchun gusinistiyalar aravachalar ramalariga tayanch barmokli plitalar 9 urnatilgan. Gidrostilindrlar shtoklarini otvaldagi kulokchalar bilan biriktiruvchi birikma sharikli podshipniklar bilan ta'minlangan. Bruslarning ta'yanch sharnirlarida ma'lum mikdorda zazor bulishi kuzda tutiladi. Itaruvchi brus va gidrostilindrlar shtoklarning bunday birikishi natijasida gusinistalar tebranganda otval fakat normal ishlabgina kolmay, balki u kundalang tekislikda sharnirlardagi ma'lum erkinlik va otvalning birmuncha egilganligi xisobiga olish imkoniga xam ega buladi. Otval otganda sharnir barmoklari 10 otval konistrukstiyasining

zurikishini kamaytirgan xolda burala oladi. Otval urtasida kanat blokli boshkarganda foydalaniladigan bloklar obaymasining kulokchasi bor.

Otval 13 ning (35-rasm, a) pastki kismida uchta urta 14, chap 15 va ung



pichogi bor. Otvalning egilgan rupara listi 5 ketidan yukoriga kuti 10 ketiga devor 6, tub 2 va diafragma 3 dan iborat pastki kuti vositasida maxkamlanadi. Bokovina 7 ning rupara list bilan brikkan joyi segent plastinlar yordamida puxtalangan Bokovinlar sirtida eyilish plastinlari 17 bor. Otvalning pastki kismi kovurgalar 16 va plastina 4 bilan puxtalangan yukorigi kismiga koziryok 9 urnatilgan. Otval ketidan kutilar 11 bilan puxtalangan bulib, unda gidrostilindrlar shtoklari Bilan biriktirish uchun kulokchalar itaruvchi bruslar Bilan biriktirish uchun kulokcha 12 va 18 xamda xovonlar bilan biriktirish uchun kulachoklar 8 bor.

Itaruvchi brus (35-rasm, b) kutisimon kesimli. Uning oldida kulokcha 23 va uchidagi vtulkaga berish sharnir barmogi 20 urnatilgan kronshteyn 19 bor. Gayka 22, shayba 27 va rostlash shaybalari 25 yordamida bu barmok vaziyatni shunday rostlash mumkinki, kulokcha 23 va barmok 20 dagi vtulka uklari bir biriga mos kelsin. Bunday rostlash kirkish burchagi va otval ogishini uzgartirishda otvalning bu uk atrofida aylanish imkoniga kashak bilan biriktirish uchun brus yukorisida kron 26 bor. Tayanch sharnir kulokchasi 28 xamda eyilganda uchun 33 bor. Bu kulokchaning gusinistiyali Gvachak maxkamlangan plixadagi barmok Bilan sharnirli birikish xalka 29 ga 30 bilan maxkamlanadigan

sukar 31 va 32 yordamida bul’dozerlardagi itaruvchi bruslarda ali aravachalar ramalariga payvandlangan kuyma tayanchlar Bilan irmoklar vositasida sharnirli birikkan teshikli kulokchalar bulgan. Bunday sharnirli kisimlarga ajratish mavadi konistrukstiyadagi sharnirlarga nisbatan ancha keyin edi. 36-rasm.

DZ-54A bul’dozer otvalini “Avtoplan 1” avtomatik sistema.

Itaruvchi brus vaziyati va uning ogish burchagi biror tomonga uzgarishi mumkin. Burchak vaziyati mayatnikli datchigi 6 itaruvchi brusning ogish burchagi uzgarganda boshkarish bloki 9 ga elektr signali beradi. Bu signal uzgarib, tokni mos ravishdagi elektr zolotnikga uzatadi, buzalotnik saloenidi zarur xolatga surilishi va ish sukjligini otvalni kutarish xamda tushirish gidrostilindrliarning tegishli bushligiga uzatilishini taminlaydi.

Otval xolatini atomatik stabillash sistemasi dvigatelning aylanish chastotasi fakat yul kuyilgan chegarada bulganda ishlaydi. Otvalda dvigvtel aylanish chastotasi yul kuyib bulmaydigan darajada pasayishiga sababchi buladigan kuchlar oshganda kontrol sistemasi stobillash avtomatini uzib, otvalning erga botishi xakida signal beradi.

Aylanish chastotasi stabillash vatomatining normal ishlaydigan darajasiga kutarilgach otval xolati takidlanadi. Dresselli teskari klapin 3 avtomat ishlaydigan otvalni tushirish tezligini rostlaydi. Avtomatning elektrik sxemasida dvigatelga ortikcha nagruska tushganda ish organini erga tez botirish nazarda tutilgan, uzilganda bul’dozer otvali odatdagi usul bilan avtomatik rejimda ishlayotganda otval oldidagi grunt xajmini uning eng katta xajmini ¾ kismi mikdorida tushishi kerak. DZ-54 bul’dozerining otval, itaruvchi brusi va kashaklari gidravlik boshkariladigan T-130 traktoriga urnatilgan DZ-27 va kanat blokli boshkariladigan T-100 M traktoriga urnatilgan DZ-53 bul’dozerida tula ishlatiladi. DZ-27 bul’dozerlarning modeli bayon etilgan bul’dozerdan xech kanday fark kilmaydi, DZ-53 bul’dozerining modeli bilan fakat otvalni boshkarish uzellari jixatidan fark kiladi.

Dvigatelning kuvvati 160 o.k li 6 (10) tk klassli T-130 M traktoriga urnatilgan gidravlik boshkariladigan DZ-110 va DZ-POXL bul'dozerlar uzellari yukoridagiga uxshash, fakat mustaxkamligi oshirilgan. DZ-YuXL bul'dozer modeli eng past temperaturalarda ishlashga muljallangan. 10 tk klassli DZ-53 bul'dozeri gidravlik stilindrlari urniga oldingi stoyka va kanat blokli boshkarish sistemasi bilan jixozlangan. (37-rasm).

37-rasm. DZ-53 bul'dozeri kanatini zapas kilish sxemasi:

1.6 va 9-oldi n. Ketingi va yonlama yunaltiruvchi bloklar oboymalari 2-polispastining yukorili ikki blokli oboymasi. 3 5 va 10- kundalang chm va ung balka, 4- zapas kanat galtagi truba 8-tortki, 11-plamka, 12 va 13 kronshteyn. 14 va 6- tayanch barmokli chap va ung lplita, 15-tusik. Oldingi yukorida kundalang balka 3, pastda polosa bilan uzaro boglangan ikkita vertikal balka 5 va 10 dan tuzilgan. Radiatorni ximoya kilish uchun old tomondan stoykaga shit 15 boltlar vositasida maxkamlangan.

Tayanch barmokli plita 14 va 16 traktor ramasi lonjeronlariga payvandlangan. Stoyka bu plitalarda plankalar 11 vositasida tutib turiladi. Traktor ramasidagi lonjeronlaridagi kronshteynlar 12 bilan birikkan tortkilar 8 stoykali oldinga kutarilib ketishidan saklab turadi.

Kuyiladigan balka urtasiga otval urtasiga maxkamlangan pastki oboymadagidek, yukoriga ikki balkali oboyma 2 sharnirli maxkamlangan bulib, otvalni kutaruvchi turt karali polistpast xosil kiladi. Kundalang balkaga ungdan oldinga yunaltiruvchi blok oboyma 1, chapdan zapas kanat galtagi 4 shtiri ulangan.

Ung stoykaga yon tomonga yunaltiruvchi blok oboymasi 9 payvandlangan. Bu oboyma truba 7 bilan chigir kronshteyni 13 ga maxkamlangan ketinga yunaltiruvchi blok oboymasiga ulangan. Truba ketingi tomondan boltlar vositasida maxkamlanib, oldidan esa yonlama yunaltiruvchi blok oboymasiga maxkamlangan uyaga kirib turadi. Uning ketingi kismi kabina orkali, oldingi kismi dvigatel yonidan utadi.

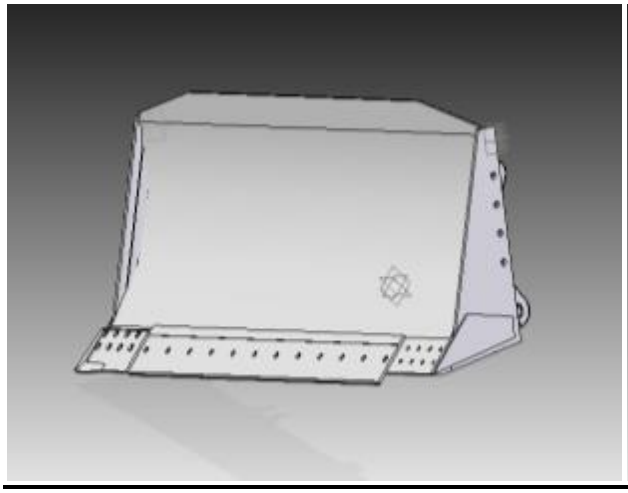
Kanat-blokli boshkarish sistemasi. Otvalni boshkarish uchun traktor ketingi kuprigiga urnatilgan va uning kuvvat olish validan biriktirish vali orkali xarakatlanuvchi bir barabanli chigirdan foydalaniladi. Chigir xakida 7-da bayon etilgan. Buriladigan bul'dozerda otval gidrostilindirlar kuchi Bilan erga majburan botiriladi. 15 tk klassli T-180 traktoriga urnatiladigan kanat-blokli boshkariladigan DZ-9 bul'dozerlar kuydagi konistruktiv xususiyatlarga ega itaruvchi bruslarni otval Bilan biriktirishda, kulachoklardan tashkari, gorizontal tekislikka urnatiladigan uzunligi rost va rostlanmaydigan dioganal kashaklardan foydalaniladi; otvalni boshkarish sistemasida yukorida bayon etilgan koniistrukstiyadagi oldingi va yonlama bloklar urniga olti karali polistpast va bita kiya urnatilgan yunaltiruvchi blokdan foydalanilgan; chigir traktor pnevmasistemasidan ishlaydigan va uning kabinasidagi kran vositasida boshkariladigan pnevmokameralari yoki pnevmostilindirlar yordamida boshkariladi; otvalda kirkish pichoklari kirrasiga 30^0 burchak ostida urnatilgan va otval yon devoriga boltlar vositasida maxkamlangan boshkarilmaydigan kengaytirgichlar bor; kirkish burchagi va otval kiyaligi ikki yoki uchta teshikli itaruvchi bruslardagi kronshteynlarda kashak uchlarini urnini almashtirish bilan uzgartiriladi; itaruvchi bruslarning tayanch sharnirlari (38-rasm, a) yopik kilib ishlangani uchun moy okib ketmaydi, 15 tk klassli T-180 traktoriga urnatilgan gidravlik boshkariladigan DZ-24 bul'dozer otvali va itaruvchi bruslarining tuzilishi DZ-39 bul'dozernikiga uxshaydi. Otval traktor gidrosistemasidagi gidrostilindr yordamida boshkariladi. Bul'dozer otvali «Avtoplan-1» tipidagi avtomatik boshkarish sistemasi Bilan jixozlanishi mumkun. 15 tk klassli T-180 traktoriga urnatilgan gidravlik boshkariladigan DZ-35 bul'dozeri DZ-24 bul'dozeridan uni kanat 8 ning bir uchi (37-rasm) chigir barabani 1 ga ulangan. Kanat chigirdan ketingi 2 yonlama 3 va oldingi 4 yunaltiruvchi bloklar, sung polistpastning yukorigi 5 va pastki 9 oboymalari bloklari orkali utkazilib, ponasimon maxkamlanib 6 vositasida maxkamlangan va zapas kanat galtagi 7-ga uraladi. Bu kanat zapas kanat uzilganda usha kismini almashtirish I uchun kerak buladi. Otvalni boshkarishda turt krali polistpastdan foydalanish otvalni kutarish uchun zarur kuch va xarakatlantirish tezligi xosil kilinishini

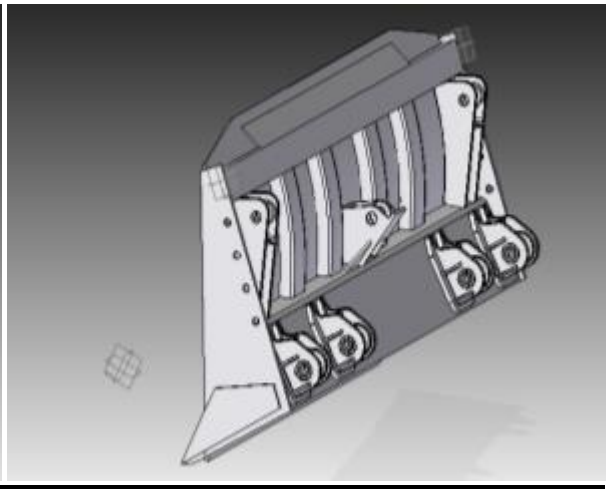
ta’minlaydi. Kanat blokli boshkarishda otval asosan ogirlik kuchi ta’sirida erga botadi. Otvali bunday boshkariladigan bul’dozer bilan gidravlik boshkariladigan bul’dozerga nisbatan yumshokrok grunt va materiallar ishlatadi gidravlika boshlakastyalangan kashaklardan biri urniga urnatilgan gidrostilindr otvalni kiyalatadi.

25 tk klassli DET-250 traktoriga urnatilgan gidravlik boshkariladigan va burilmaydigan otvali DZ-34S bul’dozeri itaruvchi bruslari sferik tayanch sharnirlarga ega (38-rasm, b). otvalni kiyalatish va kirkish burchagini uzgartirish vintli kashaklar vositasida bajariladi. DET-250 traktoridagi otvalni kutarish yoki tushirish uchu nish suyukligi gidrostilindr tayanch stapfalari orkali uzatiladi, shu maksadda ular kuzgaluvchan giometrik kilib briktirilgan buladi. Ish suyukligi bu birikishlardan metall trubalar orkali gidrostilindirlar yukorigi va pastgi bushliklariga uzatiladi.

Kuprok ishlab chikarish muljallangan TP-4 , T-330 va T-500 gusinistali traktorlariga urnatiladigan DZ-52, DZ-50, DZ-59 va DZ-68 bul’dozerlari yukorida yuayon etilgan bul’dozerlarga uxshash bulib, fakat ayrim ijobiy konstruktiv uzgartirishlar kiritilgan. Bu bul’dozerlarning xammasi gidravlik boshkariladi.

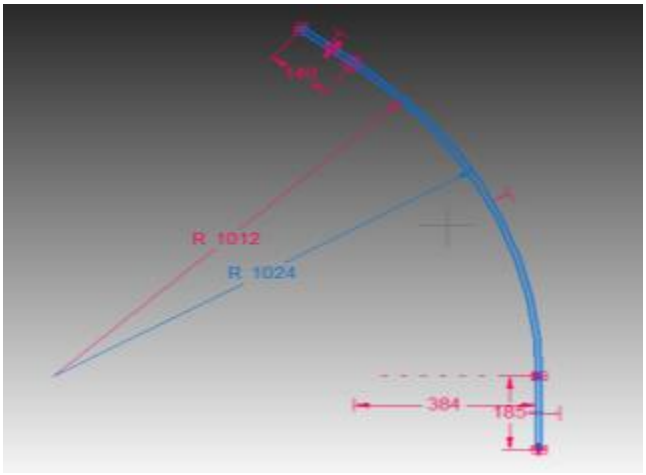
Loyixa qism





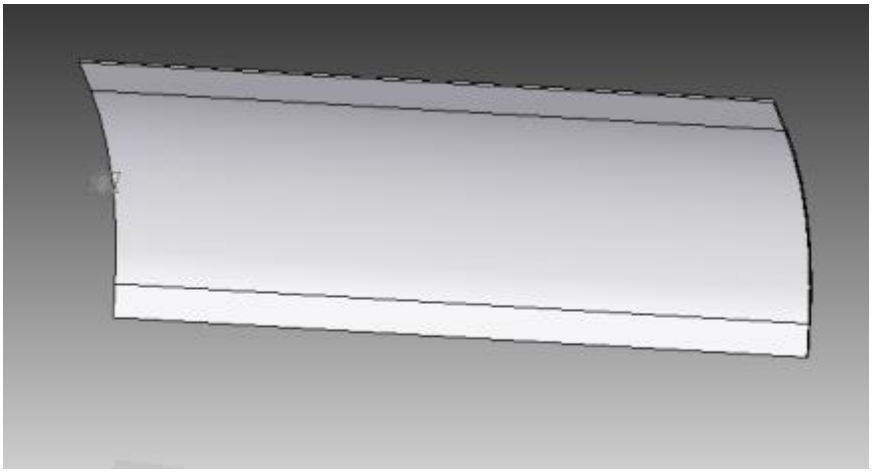
Ushbu ko’rib turganingiz yo’l qurilish mashinalaridan biri sd 23 Buldozerni asosiy ishchi jixozi otvali ko’p xajmli gruntlarni surish uchun xizmat qiladi. Otval bir necha qismlardan tashkil topgan bo’lib xar biri aloxida faylda loyixalanadi, asosiy qismni loyixalashdan boshlaymiz buning uchun detalni ikki o’lchamli ko’rinishi

Asboblardan foydalan asosiy vazifani bajaruvchi qismini ko’rsatilgan o’lchamda  uskunalar panelidan foydalanib chizib olamiz



So’ngra chizib olingan chiziqlarni birlashtirib chiqamiz va  shu tugmachani bosamiz songra berilgan uzunlikda o’stiramiz keyin

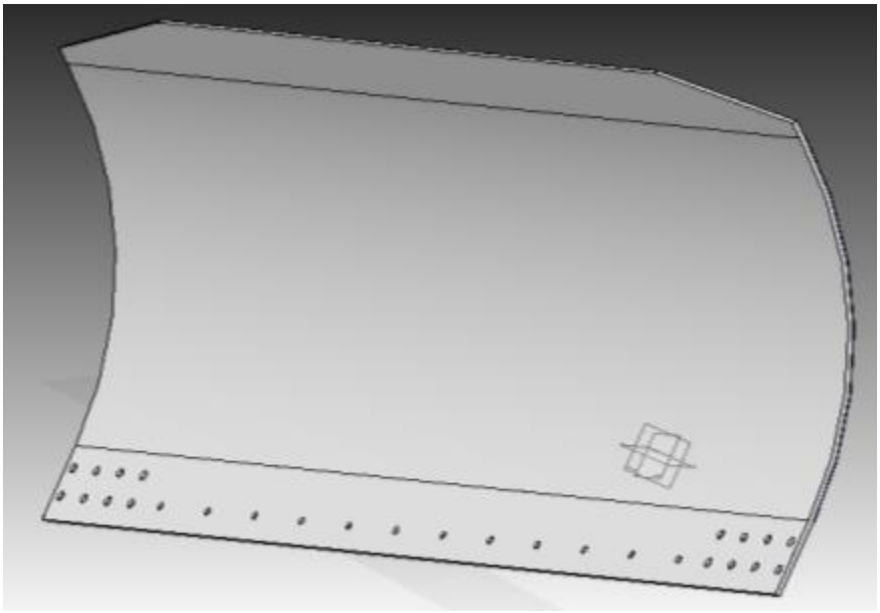
shu ko’rinishdagi detal paydo bo’ladi



Bu detalni biz “cut” 

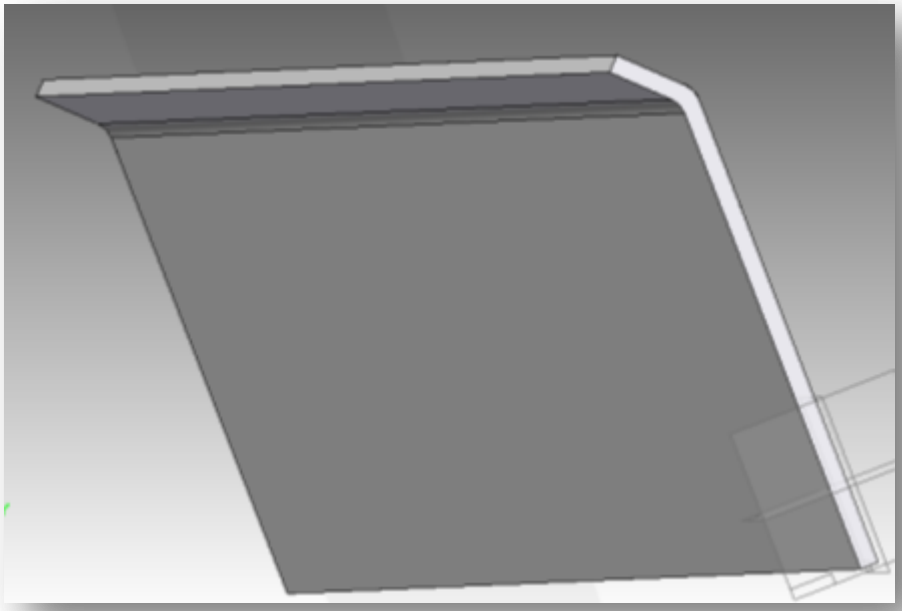
tugmasi tanlab, detalni qaysi yuzasidan qirqiladigan bo’lsa shu yuzasini belgilaymiz va  shu chiziqlar yordamida berilga o’lchamda chizib  tugmasini bosamiz va detal qalinligini belgilab teshib olamiz va 

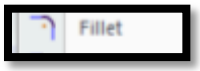
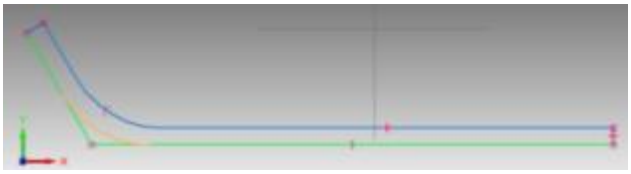
tugmasini bosamiz



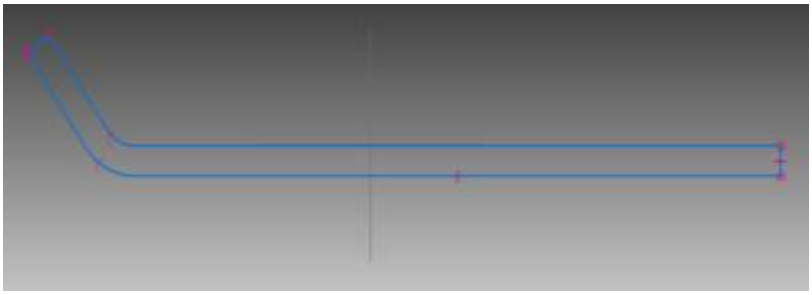
Atvalning asosiy detal qismlaridan biri tayyor boldi endi detalni qolgan qismlarini loyixalashni davom ettiramiz atvalni barcha ajraluvchi detallarini aloxida chizib olib so’ngra ularni 

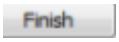
panelidan foydalanib birlashtiramiz



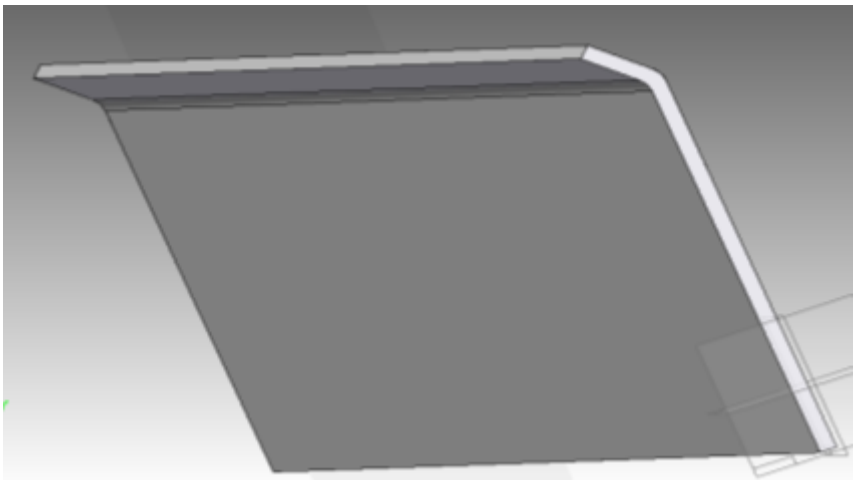
Ushbu detalni yaratish uchun  dasturini tanlab so’ngra  tugmasini bosamiz x,y,z oqlardan birini tanlab  line chizig’i yordamida ikki o’lchamli shaklini berilgan razmer asosida chizamiz va shu detalimizni burchak qismiga  tugmasini bosib berilgan o’lchamda tepa qismiga radus beramiz  keyin past qismiga radus berib 

so’ngra ushbu ko’rinishga keladi. Detalimizni ikki o’lchamli shakli toyyor bo’ldi



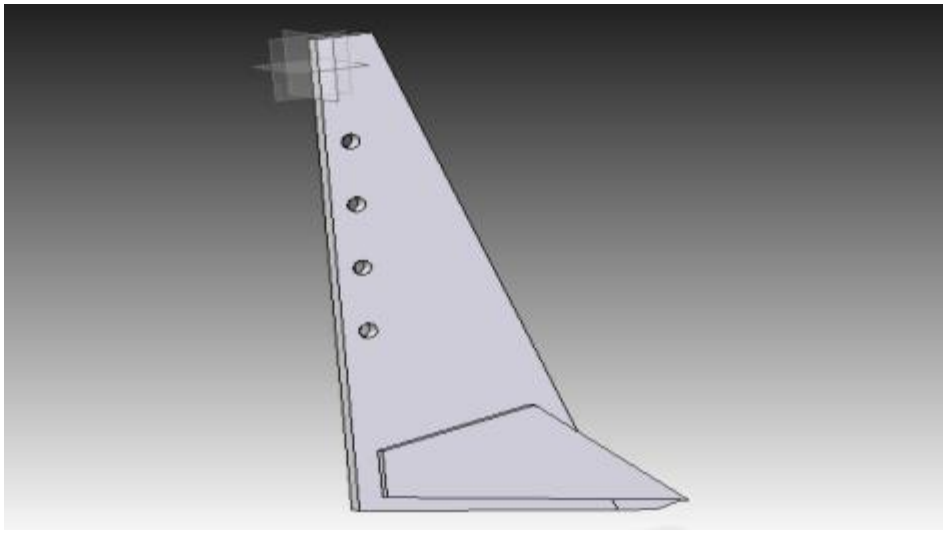
va  “close sketch close” tugmasini bosib berilgan razmerni yozib enter tugmasini bosamiz sho’ngra o’stiramiz va 

tugmasini bosamiz detalni uch ko’rinishli shakli namoyon bo’ladi

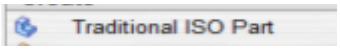


Atvalni asosiy detalidan biri “bakavina levaya”detallarini loyixalashni davom ettiramiz. Uning uchun detalimizni “bakavina ” “ rebro” “nakladka ” qismlarini aloxida chizib keyin 

Panelida birlashtiramiz



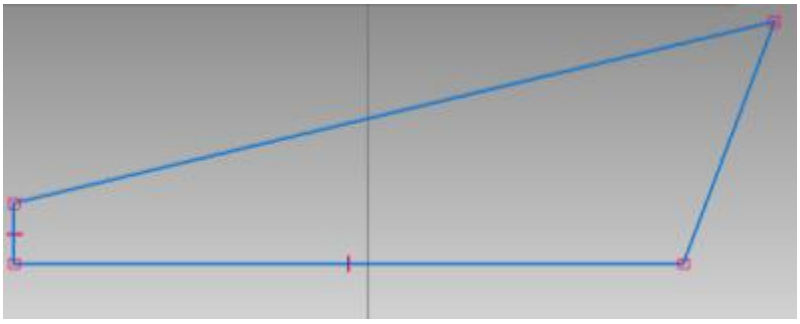
Biz atvalni yon tomonini yaratishimiz uchun Solid Edge

pragrammasidan 

tugmasi bosiladi va ishga tushadi

Extrude tugmasi bosilib uning ichki dasturi ishga tushadi


va x,y,z o’qlardan birini tanlaymiz va line tugmasi bosiladi va ikki o’chamli shakli xosil qilamiz



so’ng 

tugmasi bosiladi kegin uch o’lchamli shakli xosil bo’ladi uni 20 mm ga o’stiramiz va “cut” 

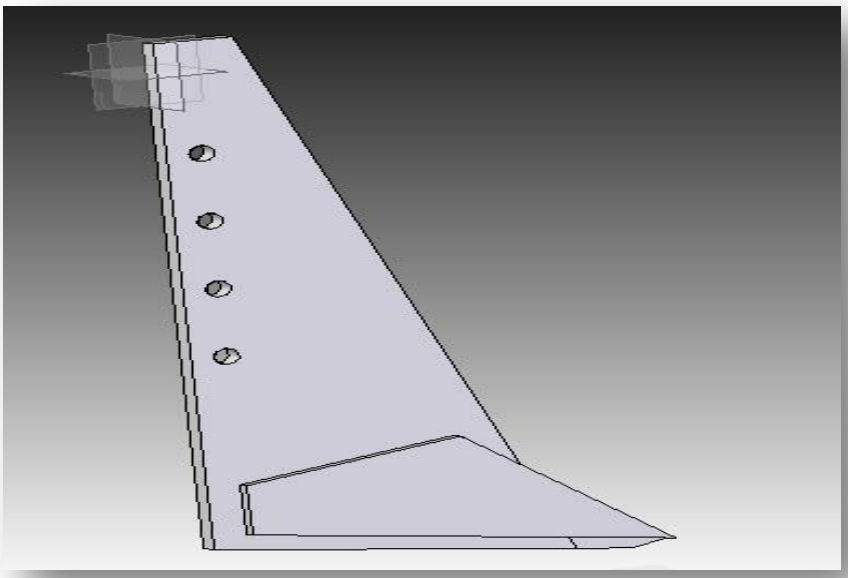
tugmasi yordamida berilga o’lchamda teshib olamiz

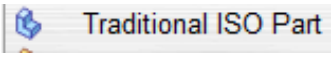
kegin ikkinchi qismini chizamiz va ularni 

dasturida birlashtiramiz. Buning uchun 

ochib 

birinchi detalimizni asosiy ekranga yuklaymiz va ikkinchi detalimizni xam yuklab olib uch urunishda birlashtiramiz



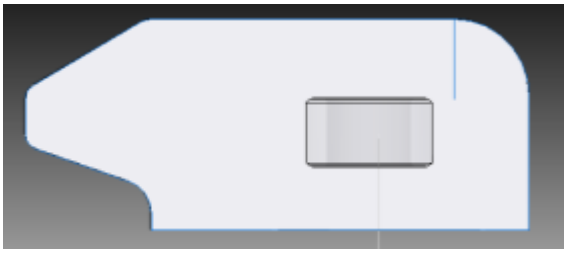
Atvalning asosiy qisimlaridan biri “proushina” detali bolib u detalni yaratilish ketma ketligi kuydagicha bo’ladi buning uchun SolidEdge ST pragrammasidan 

paneliga kirib 

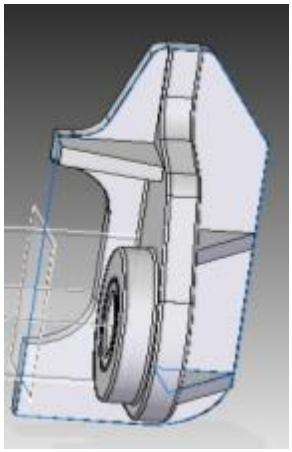
tugmachasini bosab x,y,z o’qlardan birini tanlaymiz va line tugmasi bosiladi va ikki o’chamli shakli xosil qilamiz va  “close sketch close” tugmasini bosib

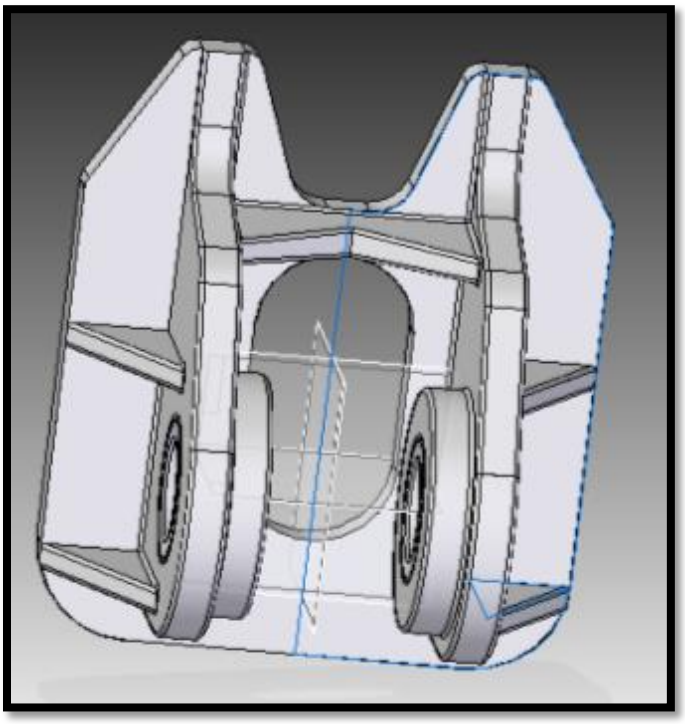
berilgan razmerga o’stiramiz va 

tugmasini bosamiz detalni uch ko’rinishli shakli nomoyon bo’ladi



Detalni yon tomoniga paralel yuza tanlanib shu yuzaga detalni yana bir qismini chizamiz



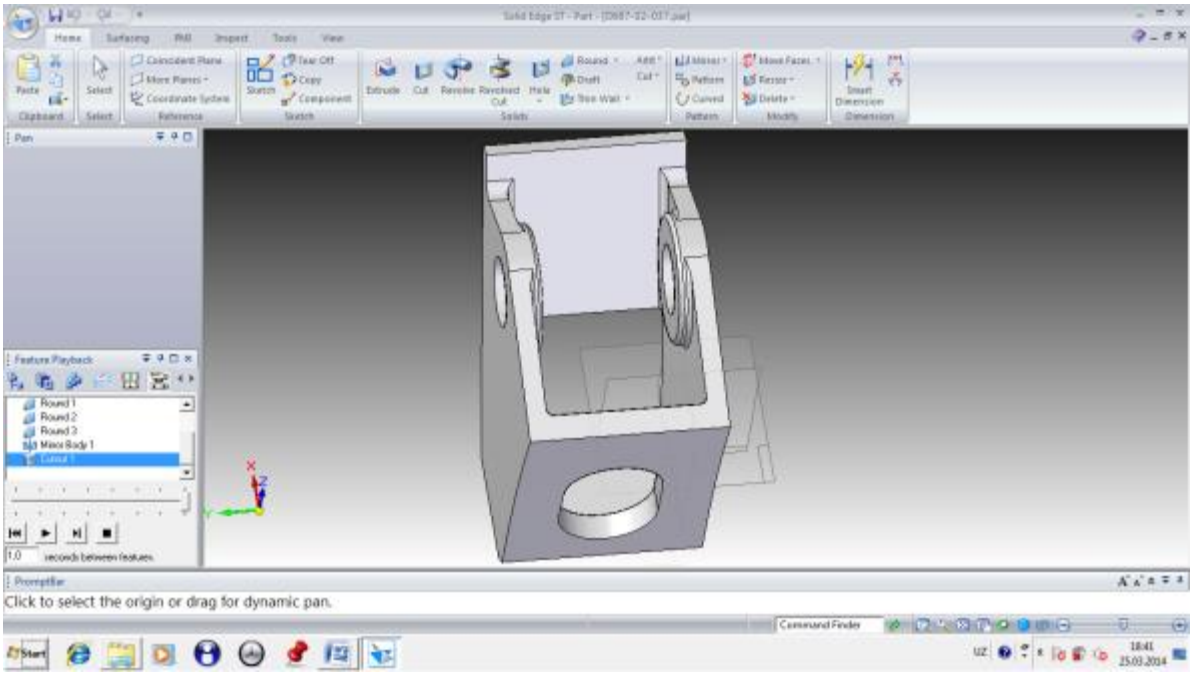


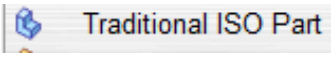
va “cut” 

tugmasi yordamida berilga o’lchamda teshib olamiz,detalimizni yarim qismi tayyor bo’ldi endi bu detalni belgilab 

tugmasini bosib yuzani tanlasak detal tayyor korinishga

keladi

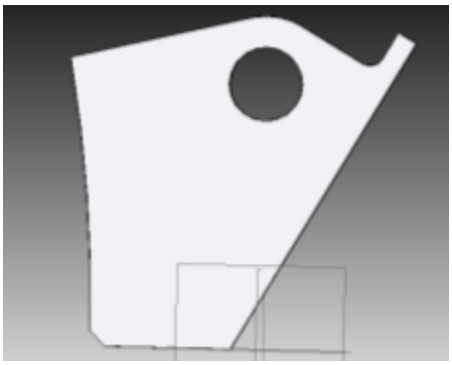


Yuqorida ko’rib turgan” kranshteyin” loyixalash quydagicha amalga oshadi.uning uchun biz SolidEdge ST pragrammasidan 

paneliga kirib 

tugmachasini bosab x,y,z o’qlardan birini tanlaymiz va line tugmasi bosiladi va ikki o’chamli shakli xosil qilamiz va  “close sketch close” tugmasini bosib berilgan razmerga o’stiramiz va 

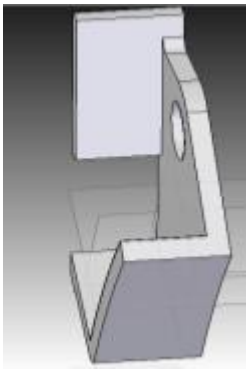
tugmasini bosamiz detalni uch ko’rinishli shakli nomoyon bo’ladi

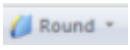


Detalni yon tomoniga paralel yuza tanlanib shu yuzaga detalni yana bir qismini 

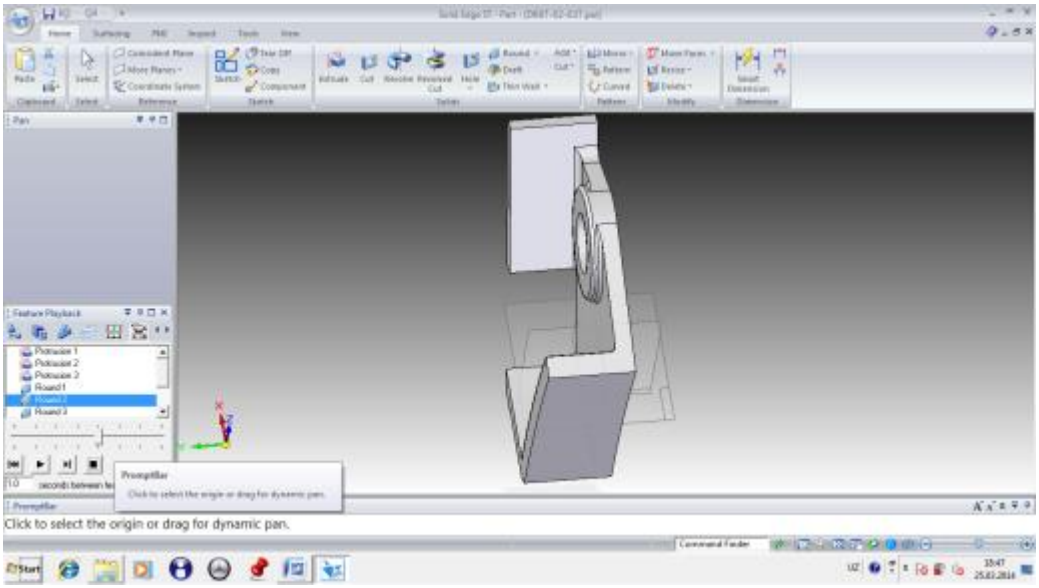
tugmachasi yordamida tanlab  line chizig’i yordamida chizamiz va “cut” 

tugmasi yordamida berilga o’lchamda teshib olamiz



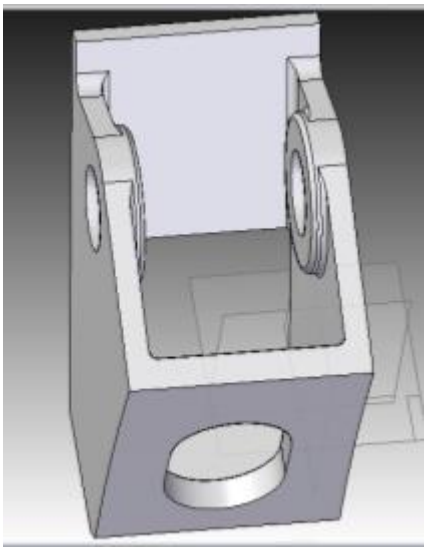
Detalimizni qirralariga va burchaklariga faska va burchak graduslar beramiz uning uchun 

tugmachasini tanlab detalimizni qirrasini belgilaymiz va necha faska berishimizni yozib enter bosamiz



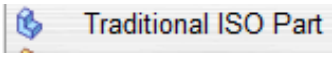
Detalimiz shu ko’rinishga kelganidan keyin endi bu detalni belgilab 

tugmasini bosamiz va shu detalimizni ichki yuzani tanlasak detal tayyor korinishga keladi



Detalimiz tayyor ko’rinishga keldi endi detalning ayrim qirralariga berilgan o’lcham asosida radius berib chiqsak detal loyixasi tayyor ko’rinishga keladi shuning bilan “kranshteyin” detalini uch o’lchamli loyixasi tayyor bo’ldi.

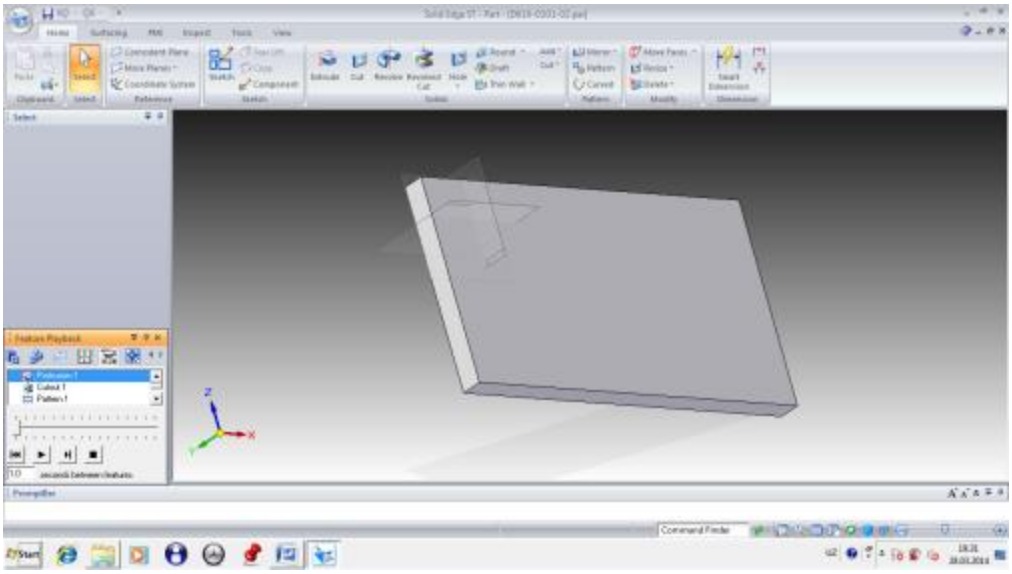
Xar bir detalni tayyorlanish ketma – ketligi aloxida loyixalanadi chunki men loyixalagan detallarim ajraladigan qismlarini chizdim xozir karopka detalini tayyorlanishini ko’rsatib o’taman buning uchun eng avvalo detalimizni ikki o’lvhamli shaklini chizib olamiz.

SolidEdge ST pragrammasi asosan uch o’lchamli shakldagi detallar chiziladi xozir chizib ko’rsatadigan detalni tayyorlanish ketma ketligini ko’rsatib o’taman. Buning uchun 

paneliga kirib 

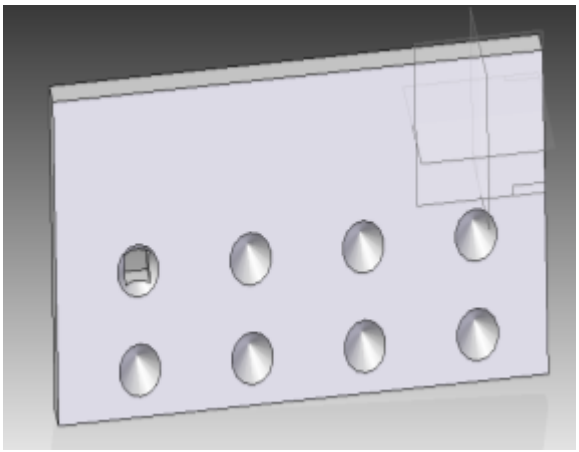
tugmachasini bosab x,y,z o’qlardan birini tanlaymiz va line tugmasi bosiladi va ikki o’chamli shakli xosil qilamiz va  “close sketch close” tugmasini bosib berilgan razmerga o’stiramiz va 

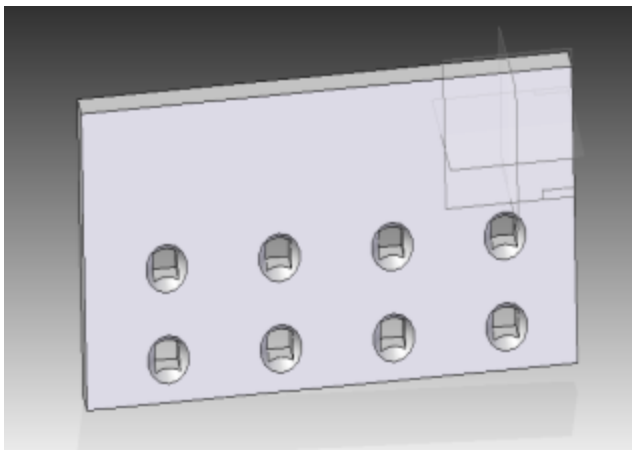
tugmasini bosamiz detalni uch ko’rinishli shakli nomoyon bo’ladi



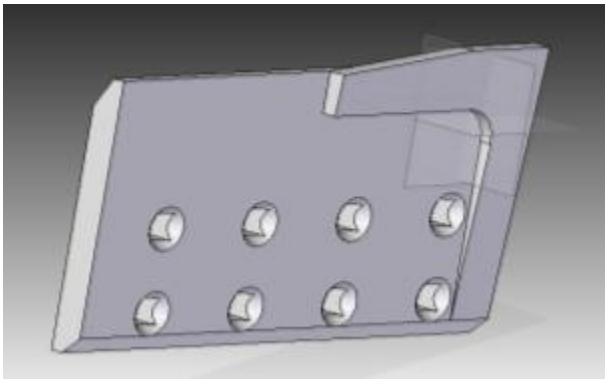
. “cut” 

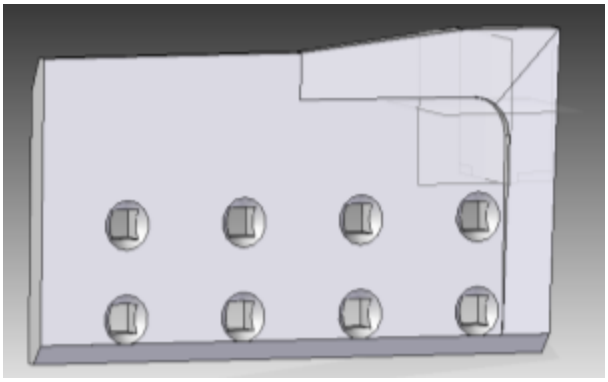
tugmasi yordamida berilga o’lchamda detalni kerakli joyini teshib olamiz



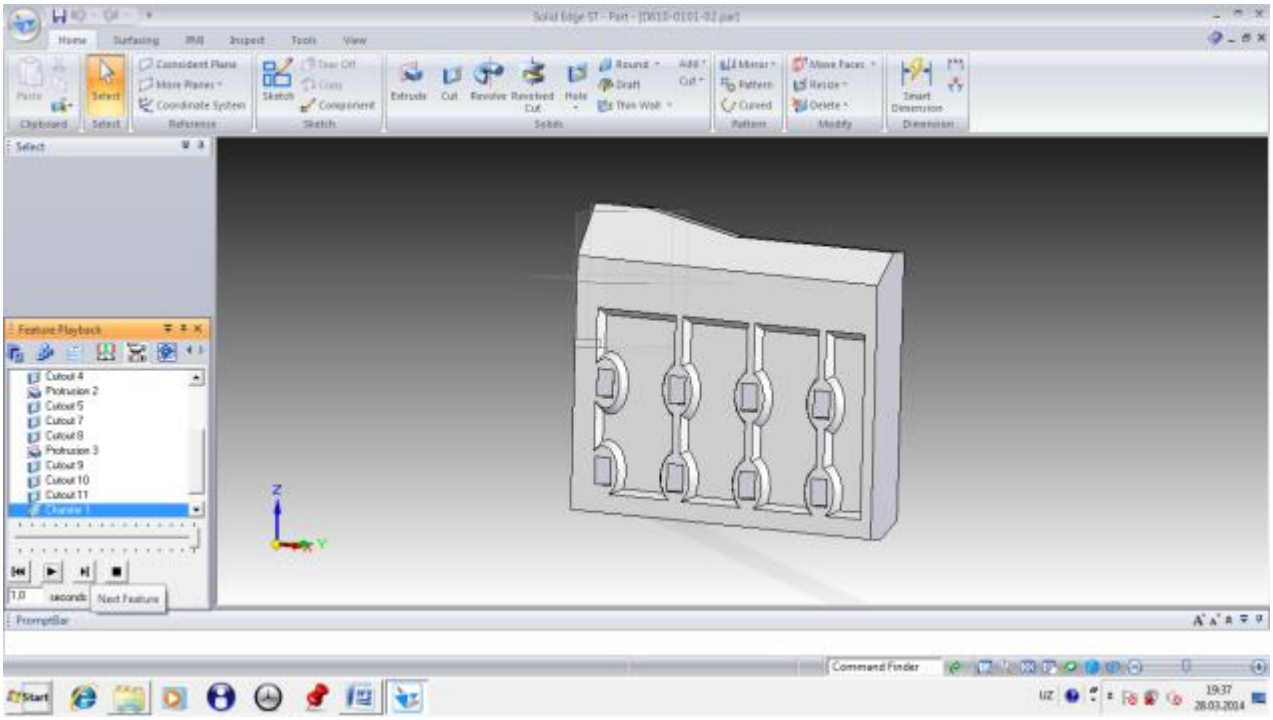


“Extrude” tugmasi yordamida detal yuzasini tanlab LINE tugmasi yordamida figurasini chizamiz,  tugmasini sichqonchaning o’ng tomoni bilan tanlaymiz va berilgan olcham asosida o’stiramiz va ko’rsatilmagan jaylarini “cut” tugmasidan foydalanib olib tashlanadi





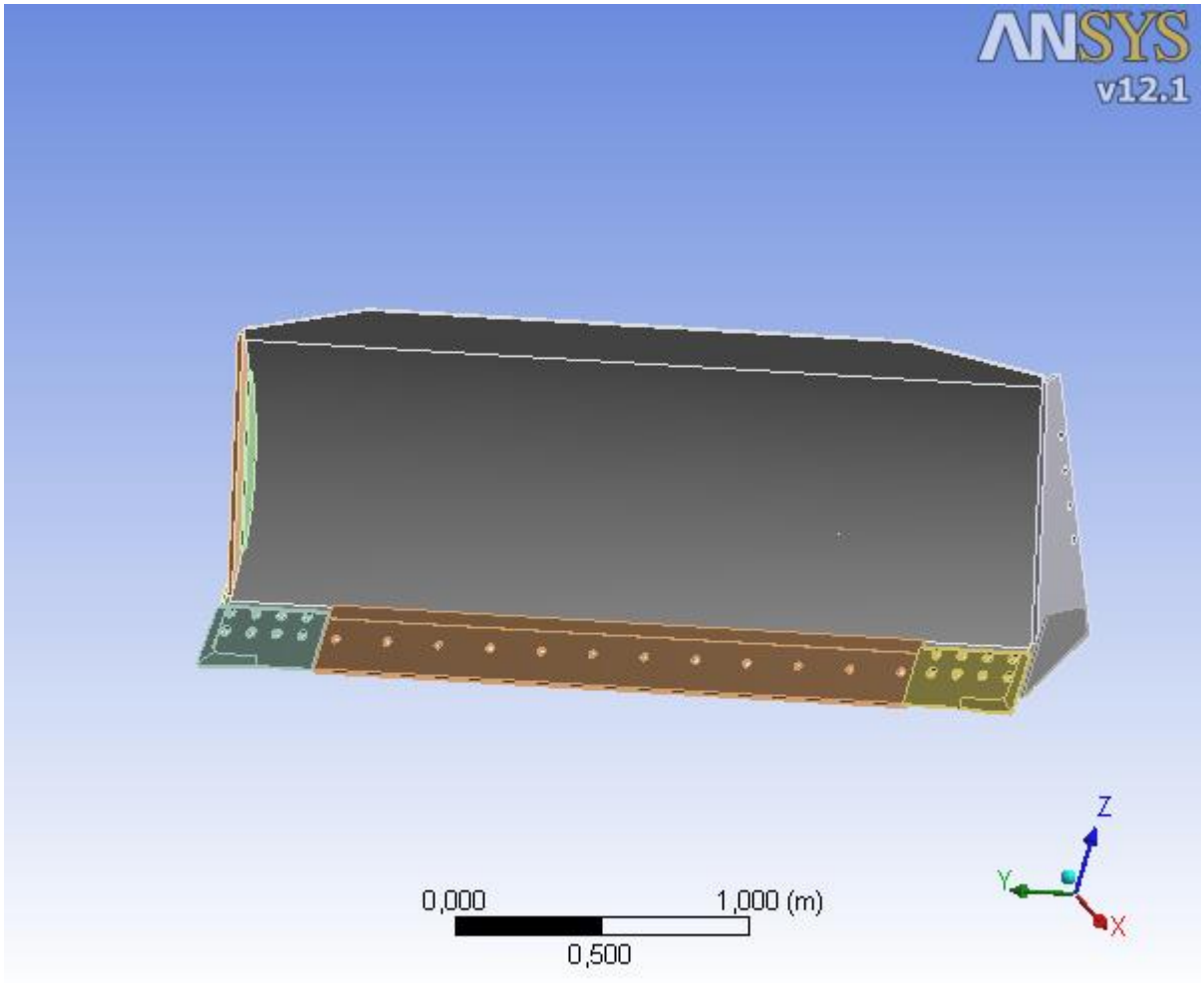
Detalimizni orqa qismidan mulum qalinlikda olib (kesib tashlaymiz) buning uchun “cut out” tugmasini sichqonchani chap tomoni bilan tanlab “line” tugmasida chizib olamiz va berilgan chuqurlikda o’yib olib tashlaymiz va faska beramiz. detalimiz tayyor boldi

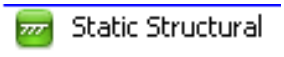


- Otvalni barcha detallari loyihalangandan keyin ” Traditional ISO Assembly” bo’limida yahlit mehanizm qilib yig’iladi.Loyixalangan otval mehanizmini **ANSYS** dasturiy paket yordamida mustaxkamlikka xisoblab chiqiladi.

Xisob qismi

Solid Edge ST dasturi yordamida loyixalangan “Ag’dargich” ni ANSYS 12.1dasturiga mustaxkamlikka xisoblash ketma ketligi quydagicha. Unga material tanlash va chekli elementlarga ajratish,tashqi kuch tasiri natijasida otvalning egilishga xisoblash.



ANSYS 12.1 dasturiga ishga tushirib uning ishchi oynasidan 

panelini sichqonchaning chap tomoni bilan ushlab asosiy oynaga yuklaymiz  va 

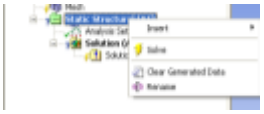
bolimining ustuga borib sichqonchaning o’ng tamonini bir marta bosiladi “Import Geometry” >

Browse.. bosiladi va men saqlagan papkamdagi chizmalarimni ochib beradi va qaysi chizmani xisoblash kerak bolsa shu chizmani tanlab “open ”tugmasini

bosamiz”Geometry” bolimi tayyor xolga keltirganimizdan so’ng “Model” boliimini ko’rib chiqamiz.

bu bilimni ustuga sichqonchani chap tomonini ikki marta bosamiz va detalimizni “Generate Mesh” 

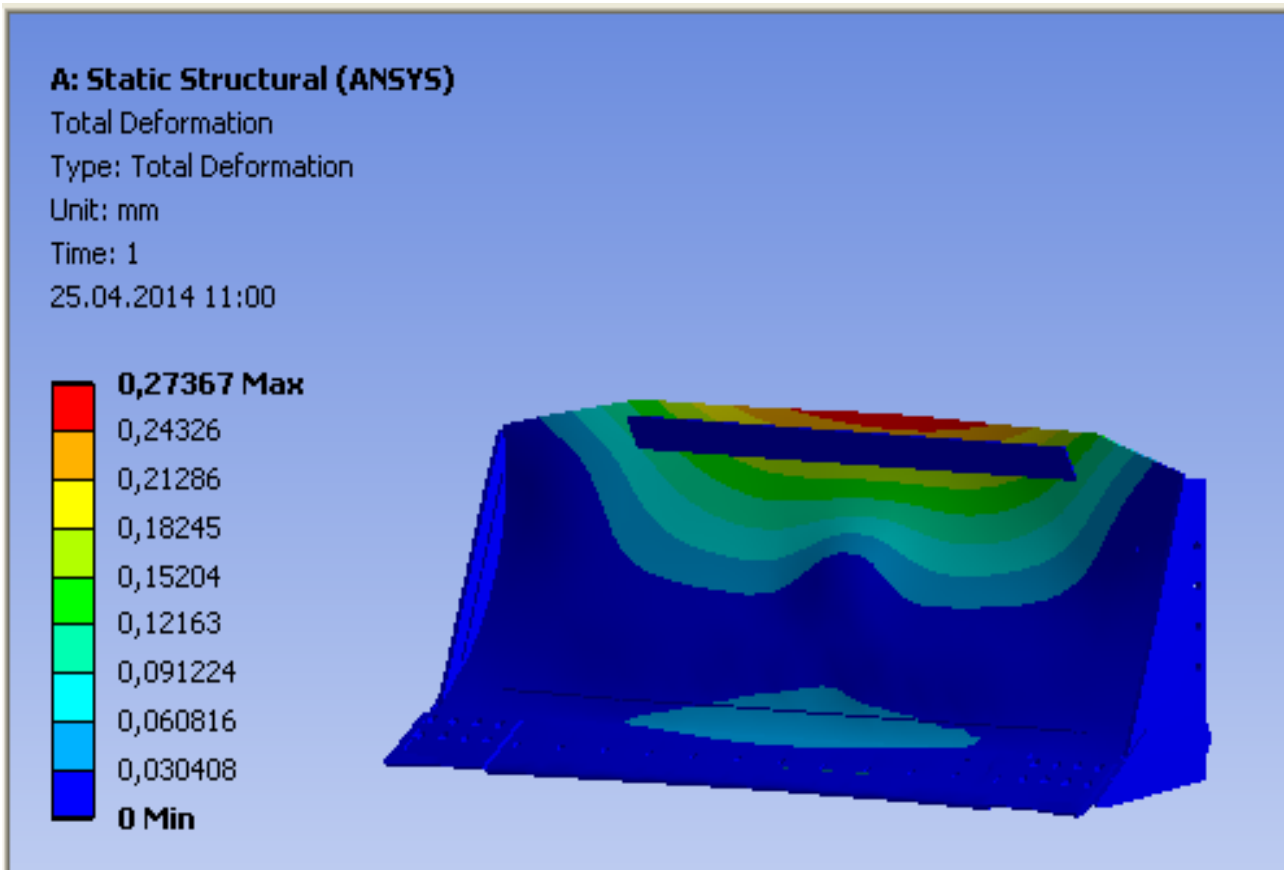
ustuga sichqonchani olib borib o’ng tomonini

bir marta bosamiz  insert tugmasini bosib 

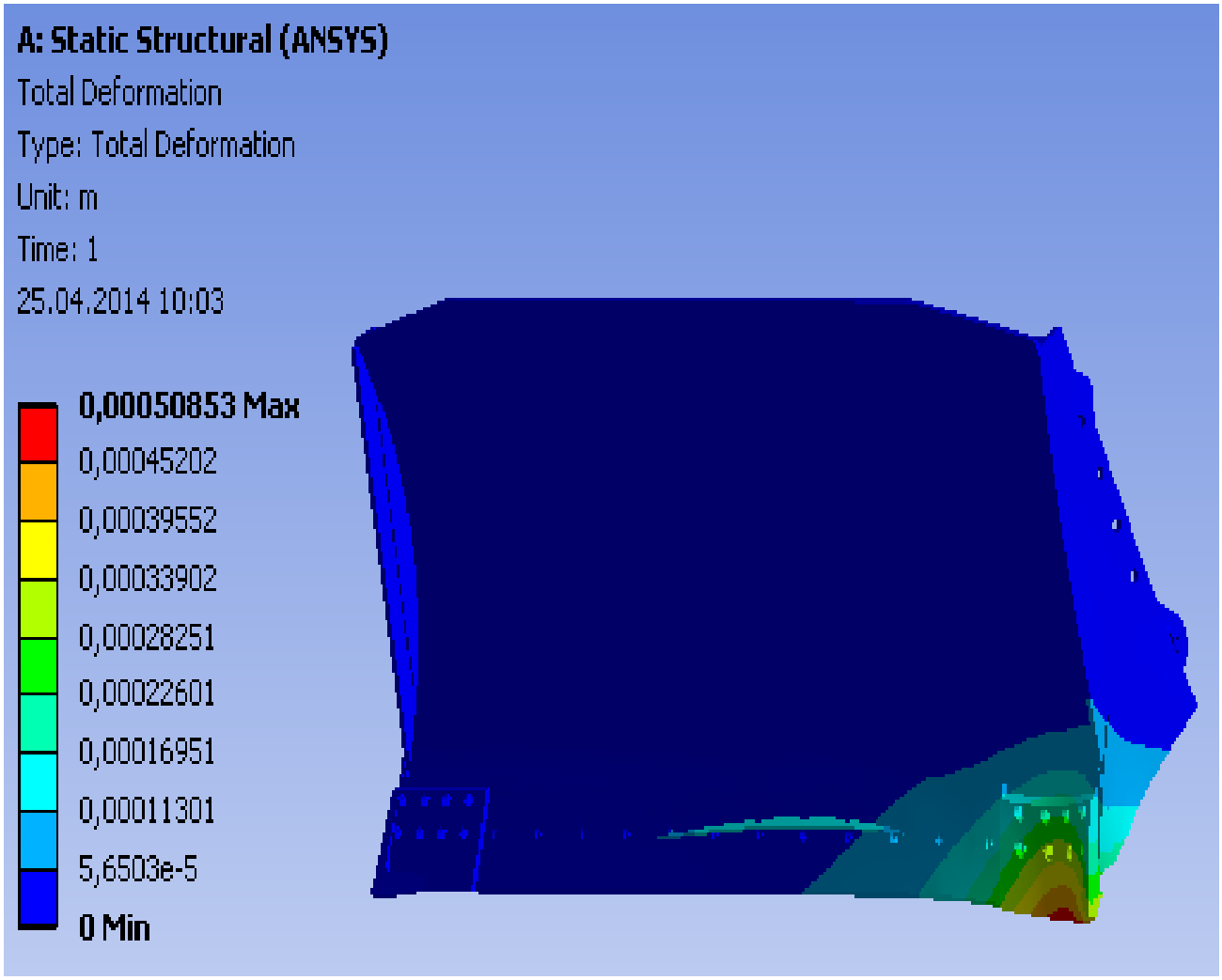
tanlab detalni bir tomondagi yuzasini belgilaymiz va “apply” tugmasini bosishimiz bilan shu yuzani maxkamlaydi.Endi detalimizga kuch tasir etkazamiz .buning uchun 

panelidan “insert”tugmasini bosib 

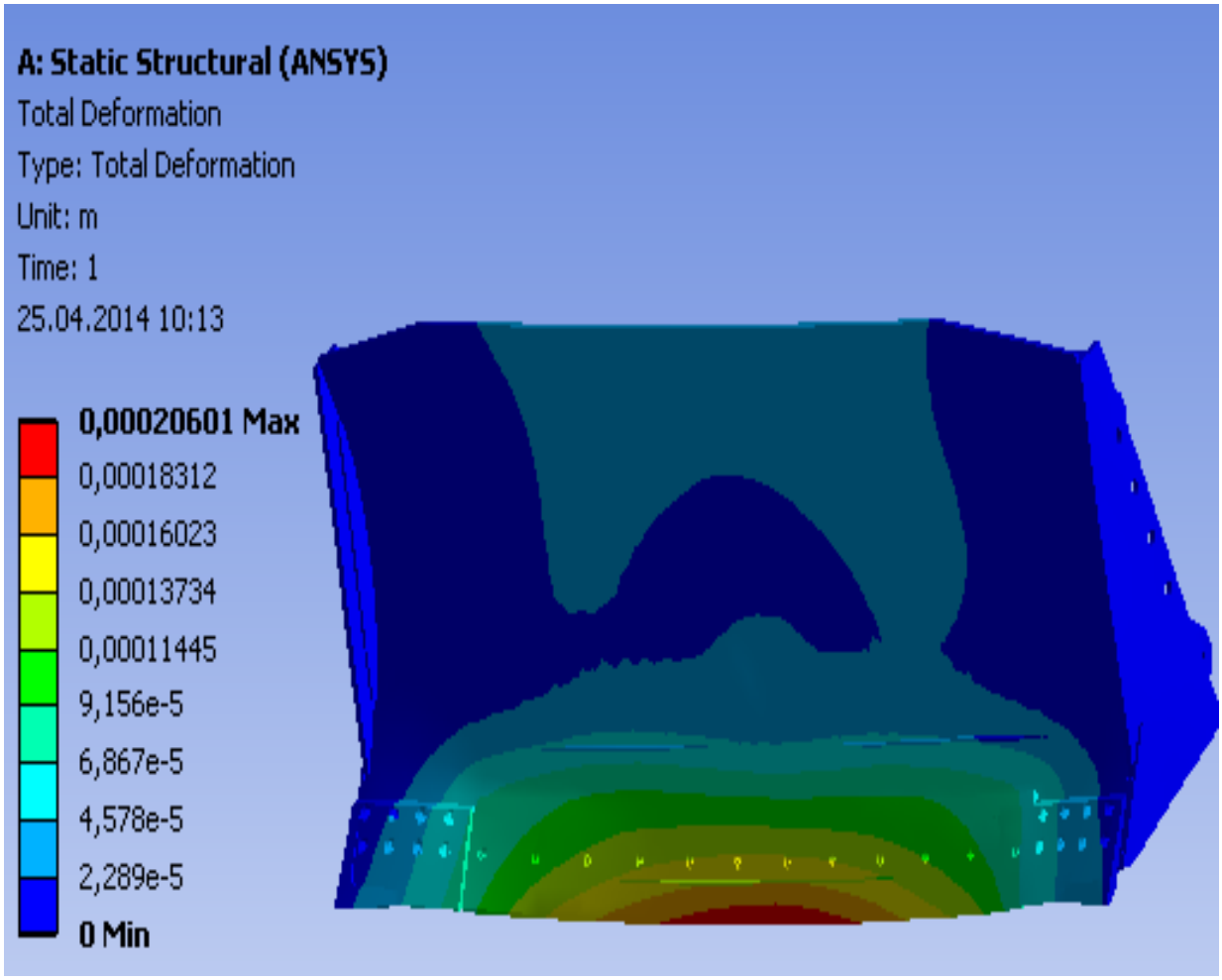
“kuch”tanlanadi va maxkamlagan detalimizga, qaysi yuzasiga kuch tasir etishi kerak bo’lsa shu yuzani belgilab chiqamiz va “apply” tugmasini bosamiz, detalimizni rangi o’zgaradi so’ngra kuch yo’nalishini ko’rsatib,kuch beramiz. “solution” ustuga borib sichqonchani o’ng tugmasini bosib “Insert”>Deformation > Total tanlaymiz va yuqorida joylashgan “Solve” ni ustiga bosamiz



- Otvalimizga kuch tasir ko’rsatishdan avval,otvalni orqa tomonidan maxkamlab olganimizdan keyin oldi tomonidan 60000 N kuch berganimda otval 0.273 mm ga bukilishini xisoblandi.



- Bu yerda otvalning o’ng pichog’iga 60000 N kuch tasirida o’ng pichoqning yuqori darajada egilgan qismi 0.5 mm ga egilishi ko’rsatilgan

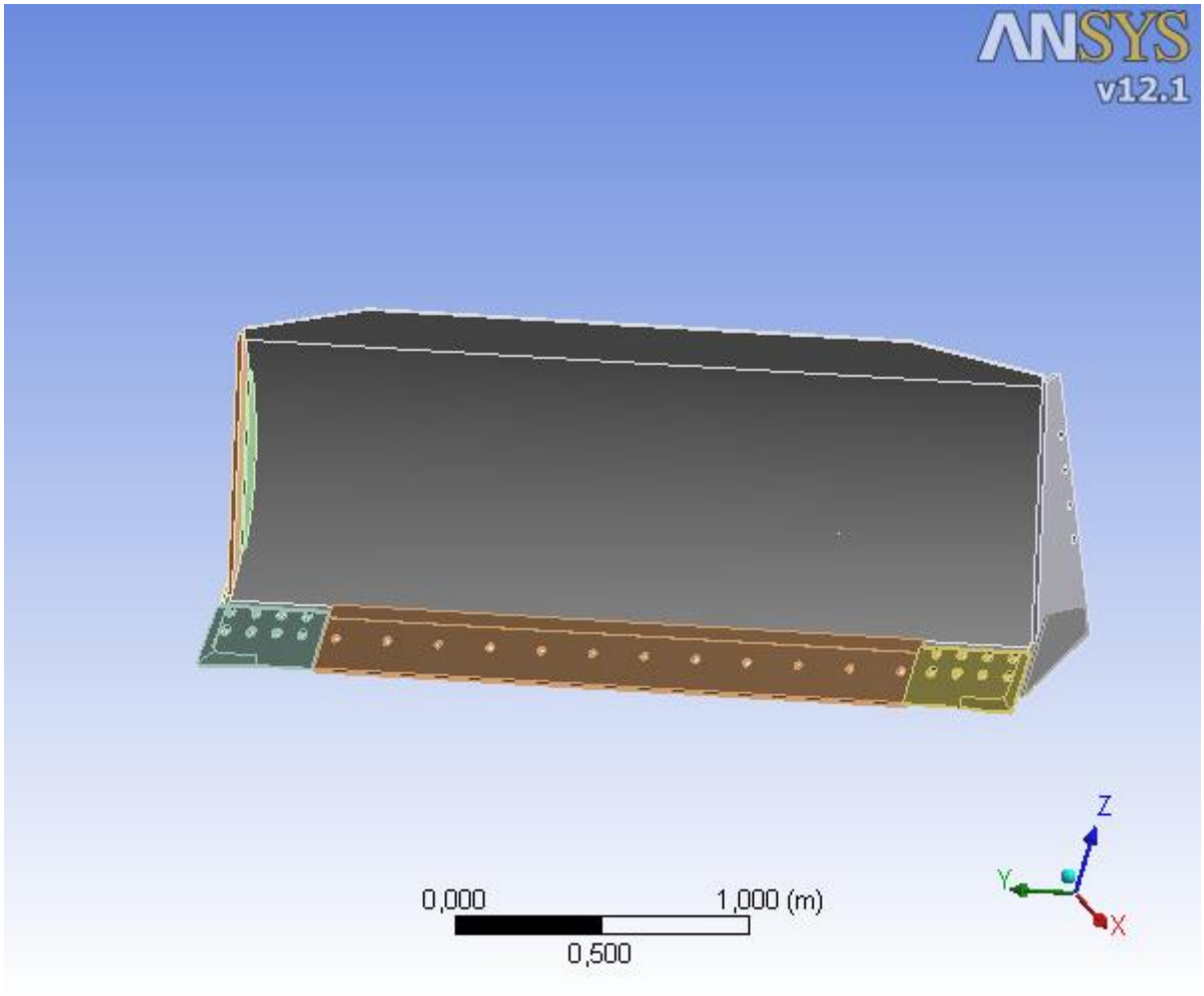


ANSYS dasturiy paketi yordamida otvalning o’rta pichog’iga 60000 N kuch tasirida otvalning yuqori darajada egilgan qismi 0.206 mm ga egilishi ko’rsatilgan

I l o v a

Project

First Saved	Tuesday, April 22, 2014
Last Saved	Tuesday, April 22, 2014
Product Version	12.1 Release



Contents

Units

TABLE 1

Unit System	Metric (m, kg, N, s, V, A) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

Geometry

TABLE 2
Model (A4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	C:\Documents and

	Settings\TEMP\Desktop\xakimjon\D687-02-010.asm
Type	Solid Edge
Length Unit	Meters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	1,0309 m
Length Y	3,176 m
Length Z	1,1572 m
Properties	
Volume	0,14133 m³
Mass	1109,5 kg
Scale Factor Value	1,
Statistics	
Bodies	46
Active Bodies	46
Nodes	173831
Elements	86352
Mesh Metric	None
Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	No
Parameter Processing	Yes

Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	Yes
Temporary Directory	C:\Documents and Settings\TEMP\Local Settings\Temp
Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry Processing	Yes

TABLE 3
Model (A4) > Geometry > Parts

Object Name	*D687-02-006.par:1*	*D687-02-008.par:1*	*D687-02-007.par:1*	*D687-02-090.asm:1,D687-02-025.par:1*	*D687-02-090.asm:1,D687-02-026.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				

Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,50976 m	0,28707 m	0,36433 m	0,99488 m	0,17471 m
Length Y	3,112 m			2,e-002 m	
Length Z	1,0772 m	0,36359 m	0,29681 m	0,98341 m	0,20682 m
Properties					
Volume	4,5864e-002 m³	1,6504e-002 m³	1,57e-002 m³	4,6376e-003 m³	1,7408e-004 m³
Mass	360,04 kg	129,55 kg	123,25 kg	36,405 kg	1,3665 kg
Centroid X	0,24502 m	0,55428 m	0,51734 m	0,35393 m	0,4104 m
Centroid Y	1,556 m			3,122 m	3,1222 m

Centroid Z	0,39426 m	5,0478e-002 m	0,31294 m	0,3601 m	-9,4967e-002 m
Moment of Inertia Ip1	327,08 kg·m²	89,501 kg·m²	101,09 kg·m²	0,24493 kg·m²	2,922e-003 kg·m²
Moment of Inertia Ip2	43,447 kg·m²	1,7649 kg·m²	1,6828 kg·m²	2,7792 kg·m²	3,3037e-003 kg·m²
Moment of Inertia Ip3	285,63 kg·m²	91,241 kg·m²	99,466 kg·m²	2,5366 kg·m²	4,7059e-004 kg·m²
Statistics					
Nodes	10705	2068	1202	713	282
Elements	4986	885	152	81	112
Mesh Metric	None				

TABLE 4
Model (A4) > Geometry > Parts

Object Name	*D687-02-090.asm:1,D610-0101-28.par:1*	*D687-02-080.asm:1,D687-02-025.par:1*	*D687-02-080.asm:1,D687-02-036.par:1*	*D687-02-080.asm:1,D610-0101-28.par:1*	*D610-0101-22.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate	Default Coordinate System				

System					
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,43456 m	0,99488 m	0,17471 m	0,43456 m	0,14664 m
Length Y	1,2e-002 m	2,e-002 m		1,2e-002 m	3,09 m
Length Z	0,51012 m	0,98341 m	0,20682 m	0,51012 m	0,1995 m
Properties					
Volume	6,6231e-004 m³	4,6376e-003 m³	1,7408e-004 m³	6,6231e-004 m³	5,9328e-003 m³
Mass	5,1991 kg	36,405 kg	1,3665 kg	5,1991 kg	46,572 kg
Centroid X	0,49048 m	0,35393 m	0,4104 m	0,49048 m	0,46267 m
Centroid Y	3,138 m	-1,e-002 m	-1,0208e-002 m	-2,6e-002 m	1,545 m
Centroid Z	8,2906e-002	0,3601 m	-9,4967e-002	8,2906e-002	0,2081

	m		m	m	9 m
Moment of Inertia Ip1	7,5818e-002 kg·m²	0,24493 kg·m²	2,922e-003 kg·m²	7,5818e-002 kg·m²	0,2238 kg·m²
Moment of Inertia Ip2	9,816e-003 kg·m²	2,7792 kg·m²	3,3037e-003 kg·m²	9,816e-003 kg·m²	37,28 kg·m²
Moment of Inertia Ip3	6,6126e-002 kg·m²	2,5366 kg·m²	4,7059e-004 kg·m²	6,6126e-002 kg·m²	37,057 kg·m²
Statistics					
Nodes	174	713	283	174	374
Elements	18	81	113	18	38
Mesh Metric	None				

TABLE 5
Model (A4) > Geometry > Parts

Object Name	*D687-02-012.par:1*	*D687-02-012.par:2*	*D687-02-012.par:3*	*D687-02-012.par:4*	*D687-02-012.par:5*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				

Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,13 m				
Length Y	2,e-002 m				
Length Z	0,16 m				
Properties					
Volume	2,08e-004 m³				
Mass	1,6328 kg				
Centroid X	0,43933 m				
Centroid Y	0,3935 m	0,2835 m	0,1835 m	8,35e-002 m	2,7185 m
Centroid Z	-6,0691e-002 m				
Moment of Inertia Ip1	9,5944e-004 kg·m²				
Moment of Inertia Ip2	3,8552e-003 kg·m²				
Moment of Inertia Ip3	3,0046e-003 kg·m²				
Statistics					
Nodes	228				
Elements	25				
Mesh Metric	None				

TABLE **6**

Model (A4) > Geometry > Parts

Object Name	*D687-02-012.par:6*	*D687-02-012.par:7*	*D687-02-012.par:8*	*D610-0101-19.par:1*	*D687-02-037.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,13 m			6,9268e-002 m	0,29941 m
Length Y	2,e-002 m			2,3 m	0,141 m
Length Z	0,16 m			8,2656e-002 m	0,29465 m

Properties					
Volume	2,08e-004 m³			1,4705e-003 m³	1,6168e-003 m³
Mass	1,6328 kg			11,544 kg	12,692 kg
Centroid X	0,43933 m			0,42443 m	0,36062 m
Centroid Y	2,8285 m	2,9285 m	3,0285 m	1,5583 m	1,5539 m
Centroid Z	-6,0691e-002 m			-0,12603 m	0,49653 m
Moment of Inertia Ip1	9,5944e-004 kg·m²			1,1225e-002 kg·m²	0,10676 kg·m²
Moment of Inertia Ip2	3,8552e-003 kg·m²			5,0068 kg·m²	0,10532 kg·m²
Moment of Inertia Ip3	3,0046e-003 kg·m²			4,9957 kg·m²	7,1452e-002 kg·m²
Statistics					
Nodes	228			1816	5302
Elements	25			207	2781
Mesh Metric	None				

TABLE **7**
Model (A4) > Geometry > Parts

Object Name	*D687-02-031.par:1*	*D687-02-031.par:2*	*D687-02-031.par:3*	*D687-02-031.par:4*	*D496-0100-46.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					

Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,34123 m				2,9281e-002 m
Length Y	0,25013 m				0,134 m
Length Z	0,31099 m				0,11051 m
Properties					
Volume	2,4369e-003 m³				8,844e-005 m³
Mass	19,13 kg				0,69425 kg
Centroid X	0,60537 m				0,3968 m
Centroid Y	0,16644 m	0,75656 m	2,9416 m	2,3514 m	1,4388 m
Centroid Z	0,32533 m				0,4248 m
Moment of Inertia Ip1	0,13337 kg·m²				2,8209e-004 kg·m²

Moment of Inertia Ip2	0,19811 kg·m²	1,1592e-003 kg·m²
Moment of Inertia Ip3	0,13943 kg·m²	8,9383e-004 kg·m²
Statistics		
Nodes	20425	261
Elements	11999	29
Mesh Metric	None	

TABLE 8
Model (A4) > Geometry > Parts

Object Name	*D496-0100-46.par:2*	*D610-0101-14.par:1*	*D610-0101-14.par:2*	*D610-0101-14.par:3*	*D610-0101-14.par:4*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear	Yes				

Effects					
Thermal Strain Effects	Yes				
Bounding Box					
Length X	2,9281e-002 m	0,10522 m	0,10606 m	0,10567 m	
Length Y	0,134 m	4,e-002 m			
Length Z	0,11051 m	0,10522 m	0,10606 m	0,10567 m	
Properties					
Volume	8,844e-005 m³	9,6232e-005 m³			
Mass	0,69425 kg	0,75542 kg			
Centroid X	0,3968 m	0,66199 m	0,66197 m	0,66196 m	
Centroid Y	1,6692 m	0,10887 m	0,224 m	0,699 m	0,81413 m
Centroid Z	0,4248 m	0,34443 m	0,3444 m	0,34439 m	
Moment of Inertia Ip1	2,8209e-004 kg·m²	7,6377e-004 kg·m²			
Moment of Inertia Ip2	1,1592e-003 kg·m²	4,7884e-004 kg·m²			
Moment of Inertia Ip3	8,9383e-004 kg·m²	4,7895e-004 kg·m²			
Statistics					
Nodes	261	1684			
Elements	29	272			
Mesh Metric	None				

TABLE **9**
Model (A4) > Geometry > Parts

Object Name	*D610-0101-14.par:5*	*D610-0101-14.par:6*	*D610-0101-14.par:7*	*D687-02-011.par:1*	*D610-0101-25.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				
Bounding Box					
Length X	0,10595 m		0,10454 m	0,3017 m	0,33454 m
Length Y	4,e-002 m			0,16 m	1,e-002 m
Length Z	0,10595 m		0,10454 m	0,45211 m	0,55773 m
Properties					
Volume	9,6232e-005 m³			1,3518e-003 m³	2,6804e-004 m³

Mass	0,75542 kg			10,612 kg	2,1041 kg
Centroid X	0,66198 m		0,662 m	0,25635 m	0,23421 m
Centroid Y	2,2939 m	2,409 m	2,884 m	2,3545 m	3,107 m
Centroid Z	0,34441 m		0,34443 m	0,57453 m	0,45877 m
Moment of Inertia Ip1	7,6377e-004 kg·m²			0,21243 kg·m²	5,2442e-004 kg·m²
Moment of Inertia Ip2	4,7884e-004 kg·m²			0,18077 kg·m²	4,6491e-002 kg·m²
Moment of Inertia Ip3	4,7895e-004 kg·m²			3,8746e-002 kg·m²	4,6002e-002 kg·m²
Statistics					
Nodes	1684			872	152
Elements	272			136	12
Mesh Metric	None				

TABLE 10
Model (A4) > Geometry > Parts

Object Name	*D687-02-035.par:1*	*Part12.par:1*	*D610-0101-25.par:2*	*D687-02-011.par:2*	*D687-02-011.par:3*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				

Coordinate System	Default Coordinate System			
Reference Temperature	By Environment			
Material				
Assignment	Structural Steel			
Nonlinear Effects	Yes			
Thermal Strain Effects	Yes			
Bounding Box				
Length X	0,12734 m	0,1173 m	0,33454 m	0,3017 m
Length Y	3,112 m	2, m	1,e-002 m	0,16 m
Length Z	0,12722 m	3,7578e-002 m	0,55773 m	0,45211 m
Properties				
Volume	6,7654e-003 m³	1,44e-003 m³	2,6804e-004 m³	1,3518e-003 m³
Mass	53,108 kg	11,304 kg	2,1041 kg	10,612 kg
Centroid X	8,1292e-002 m	-1,1455e-002 m	0,23421 m	0,25635 m
Centroid Y	1,556 m		5,e-003 m	1,8545 m	0,75352 m
Centroid Z	0,79748 m	0,84956 m	0,45877 m	0,57453 m
Moment of Inertia Ip1	42,896 kg·m²	1,3599e-002 kg·m²	5,2442e-004 kg·m²	0,21243 kg·m²
Moment of Inertia Ip2	0,10898 kg·m²	3,7816 kg·m²	4,6491e-002 kg·m²	0,18077 kg·m²
Moment of	42,983	3,768 kg·m²	4,6002e-	3,8746e-002 kg·m²

Inertia Ip3	kg·m²		002 kg·m²	
Statistics				
Nodes	1993	200	152	872
Elements	399	16	12	136
Mesh Metric	None			

TABLE 11
Model (A4) > Geometry > Parts

Object Name	*D687-02-011.par:4*	*D687-02-023.par:1*	*D687-02-023.par:2*	*D610-0101-01.par:1*	*D610-0101-02.par:1*
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Stiffness Behavior	Flexible				
Coordinate System	Default Coordinate System				
Reference Temperature	By Environment				
Material					
Assignment	Structural Steel				
Nonlinear Effects	Yes				
Thermal Strain Effects	Yes				

Bounding Box					
Length X	0,3017 m	0,33115 m		1,6684e-002 m	4,e-002 m
Length Y	0,16 m	0,15 m		2,3 m	0,435 m
Length Z	0,45211 m	0,49504 m		0,25 m	0,243 m
Properties					
Volume	1,3518e-003 m³	2,5517e-003 m³		7,5888e-003 m³	2,0975e-003 m³
Mass	10,612 kg	20,031 kg		59,572 kg	16,466 kg
Centroid X	0,25635 m	0,26446 m	0,2679 m	0,37766 m	0,36951 m
Centroid Y	1,2535 m	0,1685 m	2,9395 m	1,556 m	2,9294 m
Centroid Z	0,57453 m	0,60123 m	0,60345 m	-0,125 m	-0,14368 m
Moment of Inertia Ip1	0,21243 kg·m²	0,40256 kg·m²		26,569 kg·m²	7,1699e-002 kg·m²
Moment of Inertia Ip2	0,18077 kg·m²	0,3588 kg·m²		0,3257 kg·m²	0,33584 kg·m²
Moment of Inertia Ip3	3,8746e-002 kg·m²	9,268e-002 kg·m²		26,245 kg·m²	0,26587 kg·m²
Statistics					
Nodes	872	17780		3668	4484
Elements	136	9704		1698	2312
Mesh Metric	None				

TABLE **12**
Model (A4) > Geometry > Parts

Object Name	*D610-0101-03.par:1*
State	Meshed

Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Material	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	4,e-002 m
Length Y	0,435 m
Length Z	0,243 m
Properties	
Volume	2,0976e-003 m³
Mass	16,466 kg
Centroid X	0,36951 m
Centroid Y	0,18456 m
Centroid Z	-0,14368 m
Moment of Inertia Ip1	7,1699e-002 kg·m²
Moment of Inertia Ip2	0,33584 kg·m²

Moment of Inertia Ip3	0,26587 kg·m²
Statistics	
Nodes	4494
Elements	2321
Mesh Metric	None

Coordinate Systems

TABLE **13**
Model (A4) > Coordinate Systems > Coordinate System

Object Name	*Global Coordinate System*
State	Fully Defined
Definition	
Type	Cartesian
Ansys System Number	0,
Origin	
Origin X	0, m
Origin Y	0, m
Origin Z	0, m
Directional Vectors	
X Axis Data	[1, 0, 0,]
Y Axis Data	[0, 1, 0,]
Z Axis Data	[0, 0, 1,]

Connections

TABLE **14**
Model (A4) > Connections

Object Name	*Connections*

State	Fully Defined
Auto Detection	
Generate Contact On Update	Yes
Tolerance Type	Slider
Tolerance Slider	0,
Tolerance Value	8,8349e-003 m
Face/Face	Yes
Face/Edge	No
Edge/Edge	No
Priority	Include All
Group By	Bodies
Search Across	Bodies
Revolute Joints	Yes
Fixed Joints	Yes
Transparency	
Enabled	Yes

TABLE 15
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region*	*Contact Region 2*	*Contact Region 3*	*Contact Region 4*	*Contact Region 5*
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				

Target	1 Face				
Contact Bodies	D687-02-006.par:1				
Target Bodies	D687-02-008.par:1	D687-02-007.par:1	D687-02-090.asm:1,D687-02-025.par:1	D687-02-090.asm:1,D687-02-026.par:1	D687-02-080.asm:1,D687-02-025.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **16**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 6*	*Contact Region 7*	*Contact Region 8*	*Contact Region 9*	*Contact Region 10*
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-006.par:1				
Target Bodies	D687-02-080.asm:1,D687-02-036.par:1	D687-02-012.par:1	D687-02-012.par:2	D687-02-012.par:3	D687-02-012.par:4
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **17**

Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 11*	*Contact Region 12*	*Contact Region 13*	*Contact Region 14*	*Contact Region 15*
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-006.par:1				
Target Bodies	D687-02-012.par:5	D687-02-012.par:6	D687-02-012.par:7	D687-02-012.par:8	D687-02-037.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **18**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 16*	*Contact Region 17*	*Contact Region 18*	*Contact Region 19*	*Contact Region 20*
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Contact	1 Face				
Target	2 Faces	1 Face	2 Faces	1 Face	2 Faces
Contact Bodies	D687-02-006.par:1				
Target Bodies	D687-02-011.par:1	D610-0101-25.par:1	D687-02-035.par:1	D610-0101-25.par:2	D687-02-011.par:2
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **19**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 21*	*Contact Region 22*	*Contact Region 23*	*Contact Region 24*	*Contact Region 25*
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Contact	1 Face				
Target	2 Faces		6 Faces		1 Face
Contact Bodies	D687-02-006.par:1				
Target Bodies	D687-02-011.par:3	D687-02-011.par:4	D687-02-023.par:1	D687-02-023.par:2	D610-0101-01.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **20**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 26*	*Contact Region 27*	*Contact Region 28*	*Contact Region 29*	*Contact Region 30*
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Contact	1 Face				
Target	5 Faces		1 Face		
Contact Bodies	D687-02-006.par:1		D687-02-008.par:1		
Target Bodies	D610-0101-02.par:1	D610-0101-03.par:1	D687-02-007.par:1	D687-02-090.asm:1,D687-02-025.par:1	D687-02-080.asm:1,D687-02-025.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **21**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 31*	*Contact Region 32*	*Contact Region 33*	*Contact Region 34*	*Contact Region 35*
State	Fully Defined				

Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-008.par:1		D687-02-007.par:1		
Target Bodies	D687-02-012.par:1	D687-02-012.par:5	D687-02-090.asm:1,D687-02-025.par:1	D687-02-080.asm:1,D687-02-025.par:1	D610-0101-22.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **22**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 36*	*Contact Region 37*	*Contact Region 38*	*Contact Region 39*	*Contact Region 40*
State	Fully Defined				

Scope					
Scoping Method	Geometry Selection				
Contact	2 Faces	1 Face			
Target	2 Faces	1 Face			
Contact Bodies	D687-02-007.par:1				
Target Bodies	D687-02-037.par:1	D687-02-031.par:1	D687-02-031.par:2	D687-02-031.par:3	D687-02-031.par:4
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **23**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 41*	*Contact Region 42*	*Contact Region 43*	*Contact Region 44*	*Contact Region 45*
State	Fully Defined				

Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				19 Faces
Contact Bodies	D687-02-007.par:1				
Target Bodies	D687-02-011.par:1	D687-02-011.par:2	D687-02-011.par:3	D687-02-011.par:4	D687-02-023.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **24**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 46*	*Contact Region 47*	*Contact Region 48*	*Contact Region 49*	*Contact Region 50*
State	Fully Defined				

Scope					
Scoping Method	Geometry Selection				
Contact	2 Faces	1 Face			
Target	19 Faces	1 Face			
Contact Bodies	D687-02-007.par:1	D687-02-090.asm:1,D687-02-025.par:1			
Target Bodies	D687-02-023.par:2	D687-02-090.asm:1,D687-02-026.par:1	D687-02-090.asm:1,D610-0101-28.par:1	D610-0101-25.par:1	D687-02-035.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **25**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 51*	*Contact Region 52*	*Contact Region 53*	*Contact Region 54*	*Contact Region 55*

State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-090.asm:1,D687-02-026.par:1		D687-02-080.asm:1,D687-02-025.par:1		
Target Bodies	D687-02-090.asm:1,D610-0101-28.par:1	D610-0101-02.par:1	D687-02-080.asm:1,D687-02-036.par:1	D687-02-080.asm:1,D610-0101-28.par:1	D610-0101-22.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball Region	Program Controlled				

TABLE **26**

Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 56*	*Contact Region 57*	*Contact Region 58*	*Contact Region 59*	*Contact Region 60*
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-080.asm:1,D687-02-025.par:1		D687-02-080.asm:1,D687-02-036.par:1		D687-02-012.par:1
Target Bodies	D687-02-035.par:1	D610-0101-25.par:2	D687-02-080.asm:1,D610-0101-28.par:1	D610-0101-03.par:1	D610-0101-19.par:1
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball	Program Controlled				

Region	

TABLE **27**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 61*	*Contact Region 62*	*Contact Region 63*	*Contact Region 64*	*Contact Region 65*
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-012.par:5	D687-02-037.par:1		D687-02-031.par:1	
Target Bodies	D610-0101-19.par:1	D496-0100-46.par:1	D496-0100-46.par:2	D610-0101-14.par:1	D610-0101-14.par:2
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball	Program Controlled				

Region	

TABLE **28**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 66*	*Contact Region 67*	*Contact Region 68*	*Contact Region 69*	*Contact Region 70*
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-031.par:2		D687-02-031.par:3	D687-02-031.par:4	
Target Bodies	D610-0101-14.par:3	D610-0101-14.par:4	D610-0101-14.par:7	D610-0101-14.par:5	D610-0101-14.par:6
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball	Program Controlled				

Region	

TABLE **29**
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 71*	*Contact Region 72*	*Contact Region 73*	*Contact Region 74*	*Contact Region 75*
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	D687-02-011.par:1	D687-02-035.par:1			
Target Bodies	D687-02-035.par:1	D610-0101-25.par:2	D687-02-011.par:2	D687-02-011.par:3	D687-02-011.par:4
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Pinball	Program Controlled				

Region	

TABLE 30
Model (A4) > Connections > Contact Regions

Object Name	*Contact Region 76*	*Contact Region 77*	*Contact Region 78*	*Contact Region 79*
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	12 Faces		1 Face	
Contact Bodies	D687-02-035.par:1		D610-0101-01.par:1	
Target Bodies	D687-02-023.par:1	D687-02-023.par:2	D610-0101-02.par:1	D610-0101-03.par:1
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Pinball Region	Program Controlled			

TABLE **31**

Model (A4) > Mesh

Object Name	*Mesh*
State	Solved
Defaults	
Physics Preference	Mechanical
Relevance	0
Sizing	
Use Advanced Size Function	Off
Relevance Center	Coarse
Element Size	Default
Initial Size Seed	Active Assembly
Smoothing	Medium
Transition	Fast
Span Angle Center	Coarse
Minimum Edge Length	1,1709e-006 m
Inflation	
Use Automatic Tet Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0,272
Maximum Layers	5
Growth Rate	1,2
Inflation Algorithm	Pre
View Advanced Options	No

Advanced	
Shape Checking	Standard Mechanical
Element Midside Nodes	Program Controlled
Straight Sided Elements	No
Number of Retries	Default (4)
Rigid Body Behavior	Dimensionally Reduced
Mesh Morphing	Disabled
Pinch	
Pinch Tolerance	Please Define
Generate on Refresh	No
Statistics	
Nodes	173831
Elements	86352
Mesh Metric	None

Static Structural (A5)

TABLE **32**
Model (A4) > Analysis

Object Name	*Static Structural (A5)*
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	ANSYS Mechanical
Options	

Environment Temperature	22, °C
Generate Input Only	No

TABLE 33

Model (A4) > Static Structural (A5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined
Step Controls	
Number Of Steps	1,
Current Step Number	1,
Step End Time	1, s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation	Program Controlled

Convergence	
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Contact	No
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Documents and Settings\TEMP\Local Settings\Temp\WB_VIPC-20_2964_2\unsaved_project_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	Mks

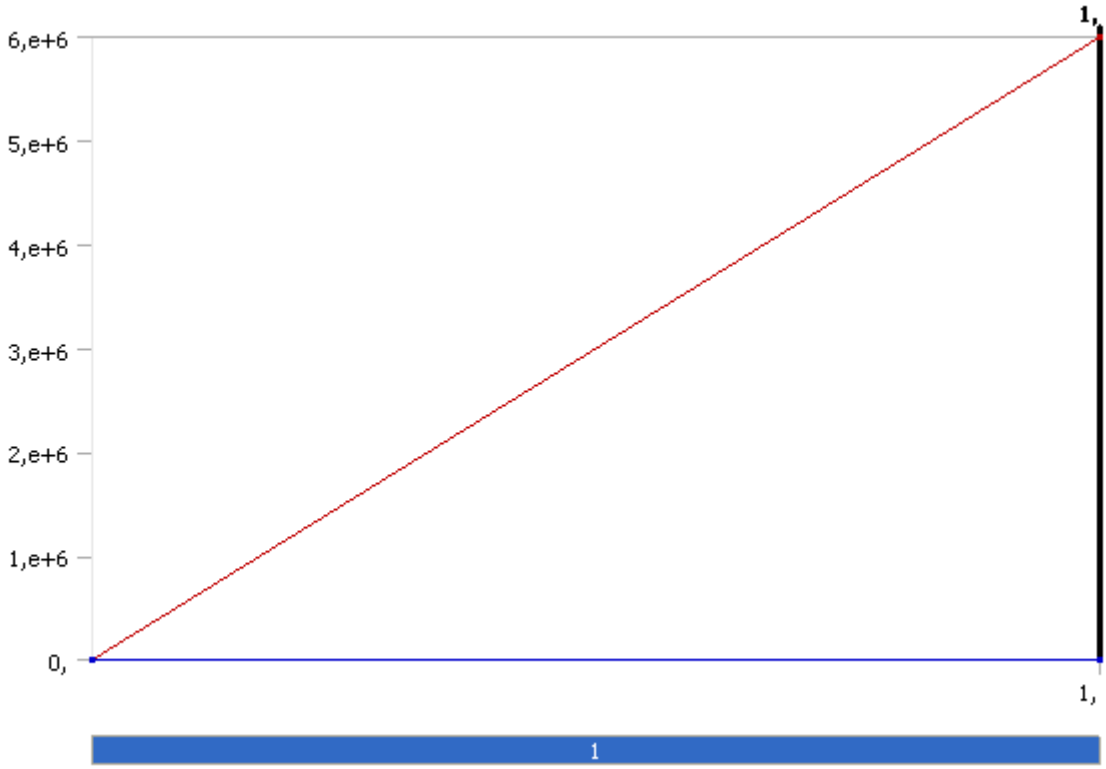
TABLE **34**

Model (A4) > Static Structural (A5) > Loads

Object Name	*Cylindrical Support*	*Pressure*
State	Fully Defined	

Scope		
Scoping Method	Geometry Selection	
Geometry	14 Faces	10 Faces
Definition		
Type	Cylindrical Support	Pressure
Radial	Fixed	
Axial	Fixed	
Tangential	Fixed	
Suppressed	No	
Define By		Components
Coordinate System		Global Coordinate System
X Component		6,e+006 Pa (ramped)
Y Component		0, Pa (ramped)
Z Component		0, Pa (ramped)

FIGURE **1**
Model (A4) > Static Structural (A5) > Pressure



Solution (A6)

TABLE 35
Model (A4) > Static Structural (A5) > Solution

Object Name	*Solution (A6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 36
Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information

Object Name	*Solution Information*
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0

Update Interval	2,5 s
Display Points	All

TABLE **37**

Model (A4) > Static Structural (A5) > Solution (A6) > Results

Object Name	*Total Deformation*
State	Solved
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Definition	
Type	Total Deformation
By	Time
Display Time	Last
Calculate Time History	Yes
Identifier	
Results	
Minimum	0, m
Maximum	8,6529e-002 m
Minimum Occurs On	D687-02-037.par:1
Maximum Occurs On	D687-02-006.par:1
Information	
Time	1, s
Load Step	1
Substep	1

Iteration Number	1

Material Data

Structural Steel

TABLE **38**
Structural Steel > Constants

Density	7850 kg m^-3
Coefficient of Thermal Expansion	1.2e-005 C^-1
Specific Heat	434 J kg^-1 C^-1
Thermal Conductivity	60.5 W m^-1 C^-1
Resistivity	1.7e-007 ohm m

TABLE **39**
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE **40**
Structural Steel > Compressive Yield Strength

Compressive Yield Strength Pa
2.5e+008

TABLE **41**
Structural Steel > Tensile Yield Strength

Tensile Yield Strength Pa
2.5e+008

TABLE **42**
Structural Steel > Tensile Ultimate Strength

Tensile Ultimate Strength Pa
4.6e+008

TABLE **43**

Structural Steel > Isotropic Secant Coefficient of Thermal Expansion

Reference Temperature C
22

TABLE **44**

Structural Steel > Alternating Stress Mean Stress

Alternating Stress Pa	Cycles	Mean Stress Pa
3.999e+009	10	0
2.827e+009	20	0
1.896e+009	50	0
1.413e+009	100	0
1.069e+009	200	0
4.41e+008	2000	0
2.62e+008	10000	0
2.14e+008	20000	0
1.38e+008	1.e+005	0
1.14e+008	2.e+005	0
8.62e+007	1.e+006	0

TABLE **45**

Structural Steel > Strain-Life Parameters

Strength Coefficient Pa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient Pa	Cyclic Strain Hardening Exponent
9.2e+008	-0.106	0.213	-0.47	1.e+009	0.2

TABLE **46**

Structural Steel > Isotropic Elasticity

Temperature	Young's Modulus	Poisson's	Bulk Modulus	Shear Modulus

C	Pa	Ratio	Pa	Pa
	2.e+011	0.3	1.6667e+011	7.6923e+010

TABLE **47**
Structural Steel > Isotropic Relative Permeability

Relative Permeability
10000

Foydalanilgan adabiyotlar ro'yxati

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