BOĞAZİÇİ YAZILIM/UNIGRAPHICS

UG NX CAM
Geçiş Eğitimi

Eğitmen : **Melih DİZDAR**

EĞİTİM PLANI

Başlangıç Saati : 09:30

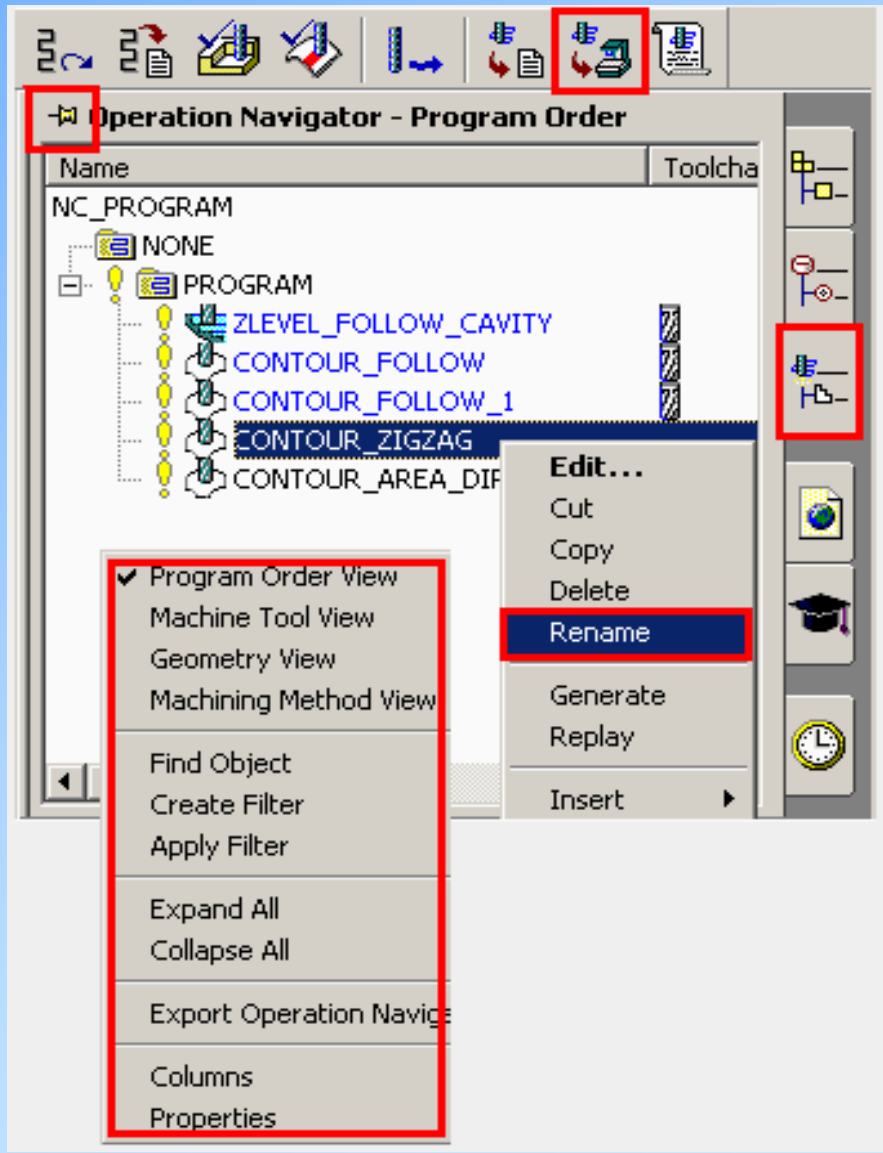
Öğle Arası : 12:00 – 13:00

Bitiş Saati : 17:00

Her 50 dk. 10 dk. mola

OPERATION NAVIGATOR YENİLİKLERİ

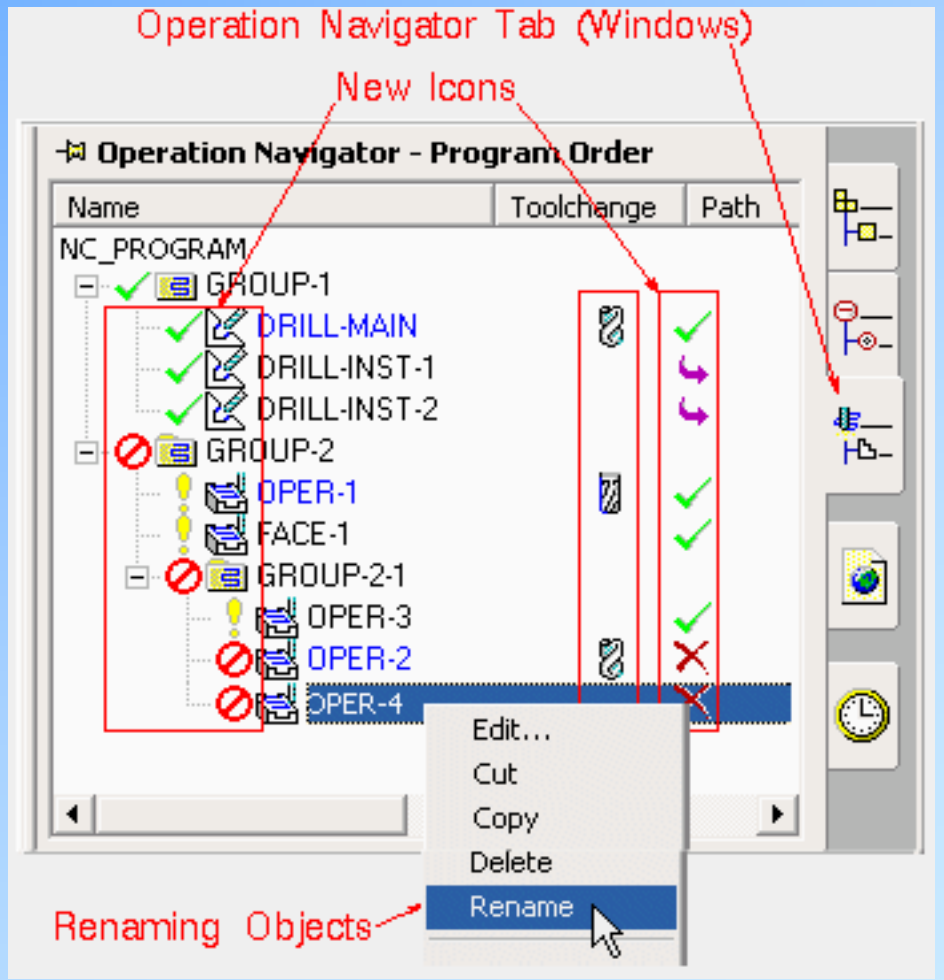
Operation Navigator üzerinde yapılan değişiklikler ile kullanım; ve yapılmış olan işlemler üzerindeki değişikliklere daha kolay ulaşma imkanı getirilmiştir.



OPERATION NAVIGATOR YENİLİKLERİ

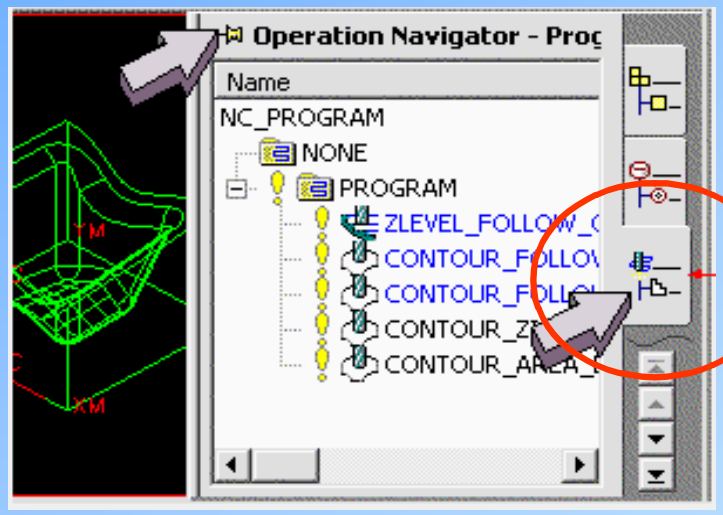
Yenilikler arasında operasyonları simgeleyen ikonlar ve operasyon içerisindeki uygulamalar konusunda bilgilendiren işaretler ilk sırada yer almaktadır.

Operasyonların isimlerini değiştirmek için MB3 yeterli olacaktır.

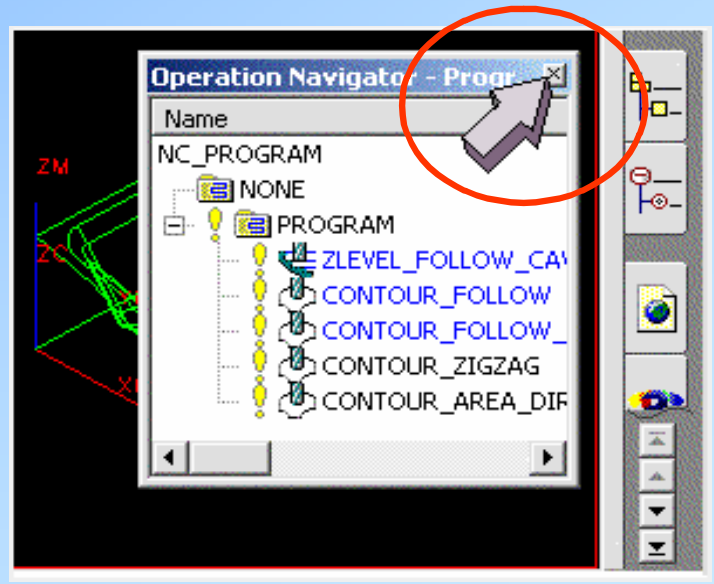


OPERATION NAVIGATOR YENİLİKLERİ

Windows tabanlı işletim sistemlerinde Operation Navigator çizim ekranının sağında veya solunda yer alabildiği gibi, istenildiği zaman istenilen konuma da yerleştirilebilir.

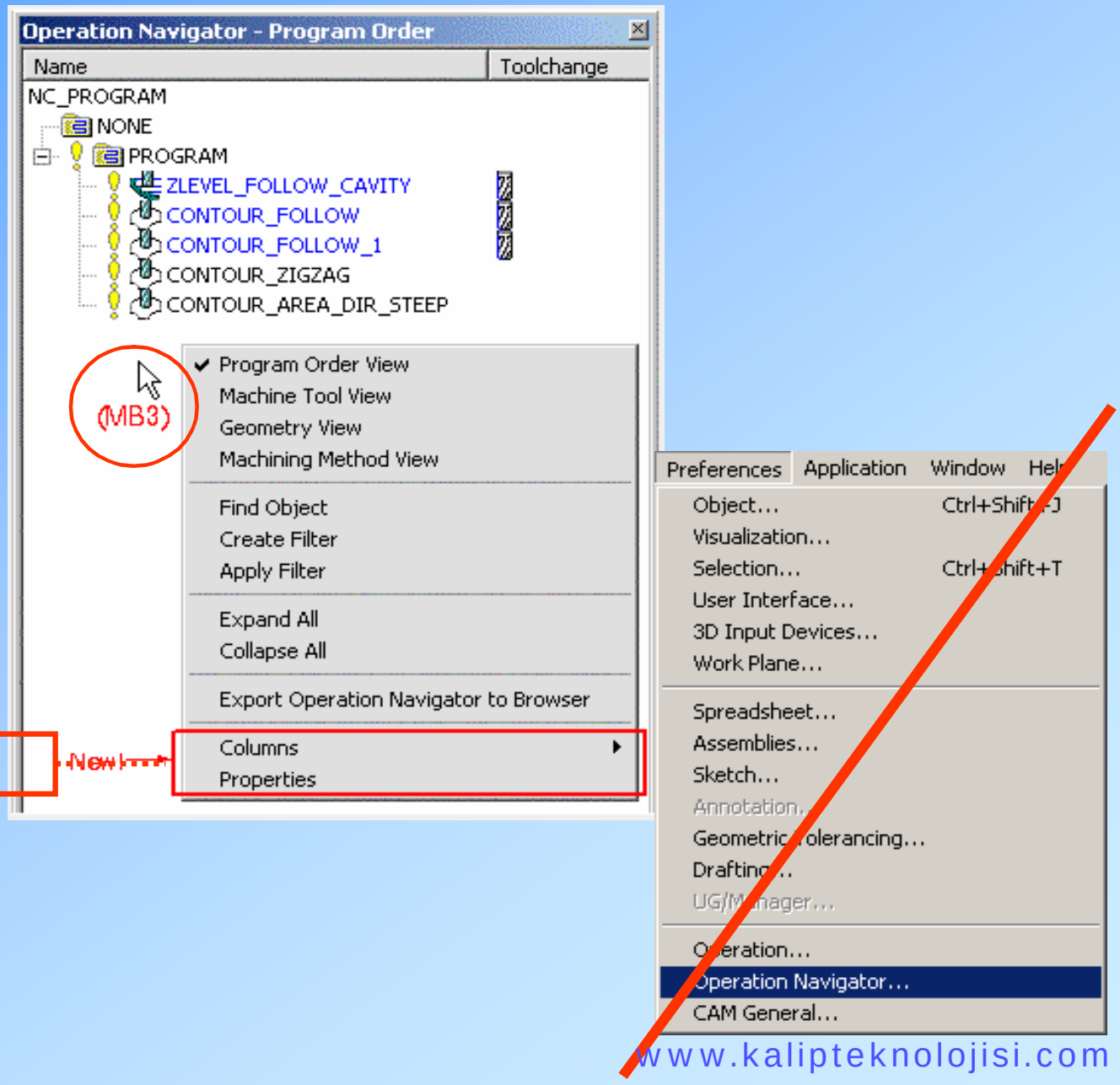


Operation Navigator istenilen konuma alınmak isteniyorsa, ilk resimdeki kısımda çift MB1 ile serbest konuma alınır. Pencere kapatıldığında eski konumuna geri döner.



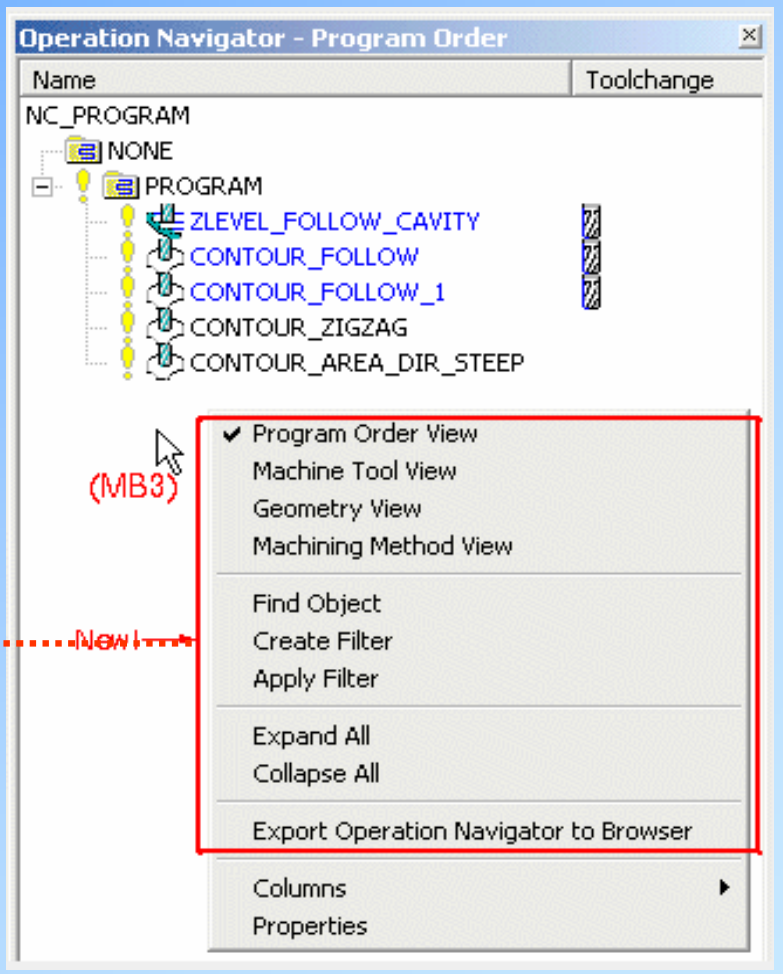
OPERATION NAVIGATOR YENİLİKLERİ

Daha önceki versiyonlarda ancak Preferences – Manufacturing – Operation Navigator ile değiştirilen CAM uygulamalarına ait kolonlar ve özellikler artık MB2 ile daha kolaylıkla yapılabilir.



OPERATION NAVIGATOR YENİLİKLERİ

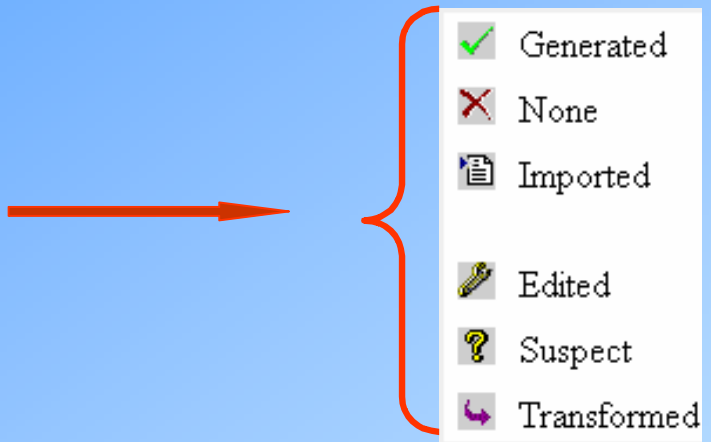
Takım, Geometri, Program, Metot görünümleri arasındaki geçişler daha kolay olduğu gibi, daha önceleri Pull Down menü yardımıyla yapılan birçok işlem artık MB3 yardımıyla daha kolay yapılabilmektedir.



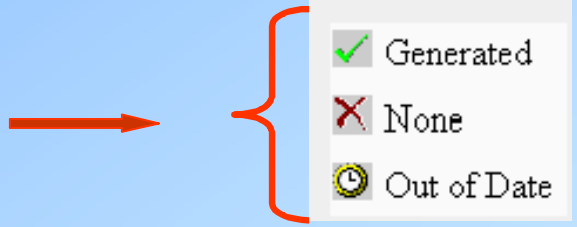
OPERATION NAVIGATOR YENİLİKLERİ

Takım Değiştirme Kolonunda, sonraki işlemin takımına ait özellikler listelenebilir.

Bunun için kullanılan ikonlar yanda sıralanmıştır.

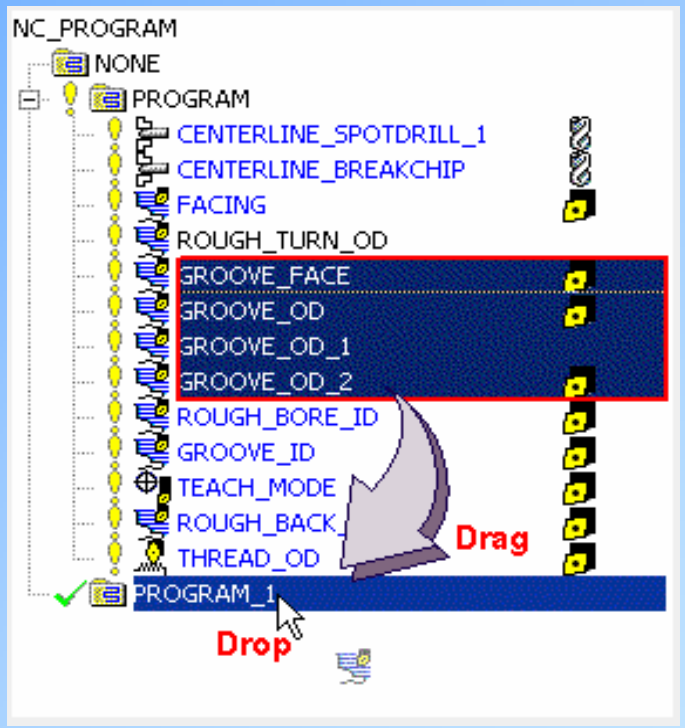


In-Process Workpiece (IPW) adı verilen işlenmemiş kısım olarak da tanımlayabileceğimiz FACETED BODY için kullanılan ikonlar IPW başlıklı kolonda sıralanır.



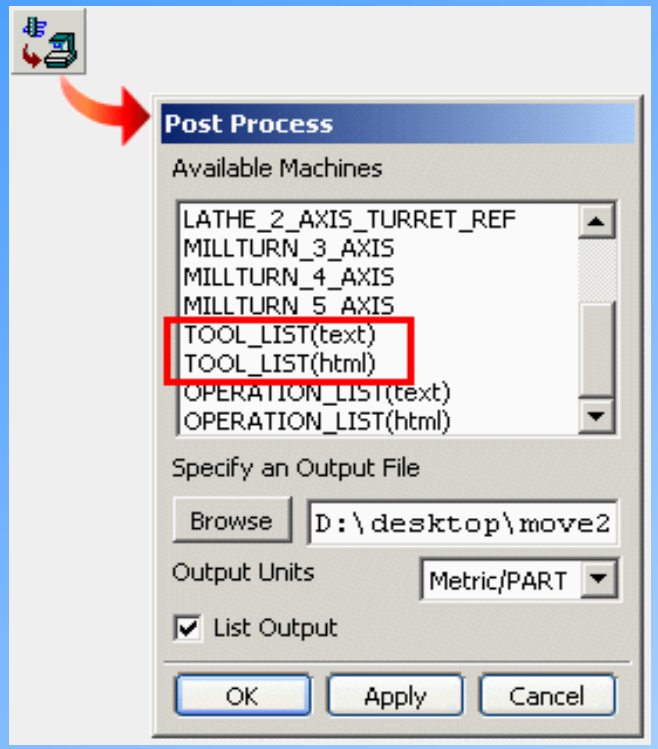
OPERATION NAVIGATOR YENİLİKLERİ

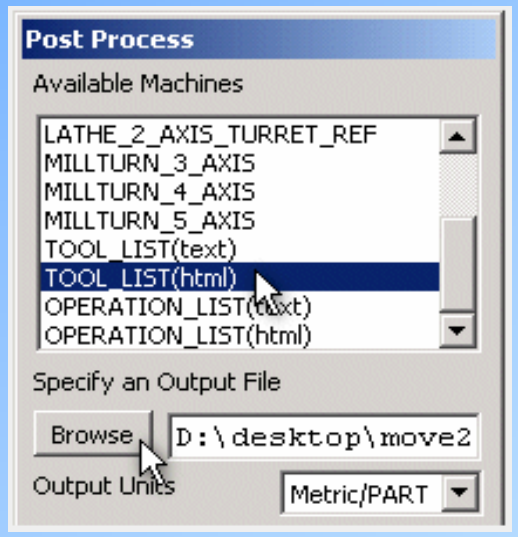
Yapılmış olan operasyonlar, mevcut konumundan başka bir operasyon veya program altına Drag & Drop (Sürükle & Bırak) yöntemiyle taşınabilir.



SHOP DOCUMENTATION YENİLİKLERİ

Takım Listesi Postprocess esnasında oluşturulabilir.





TOOLING LIST

MILLING TOOLS

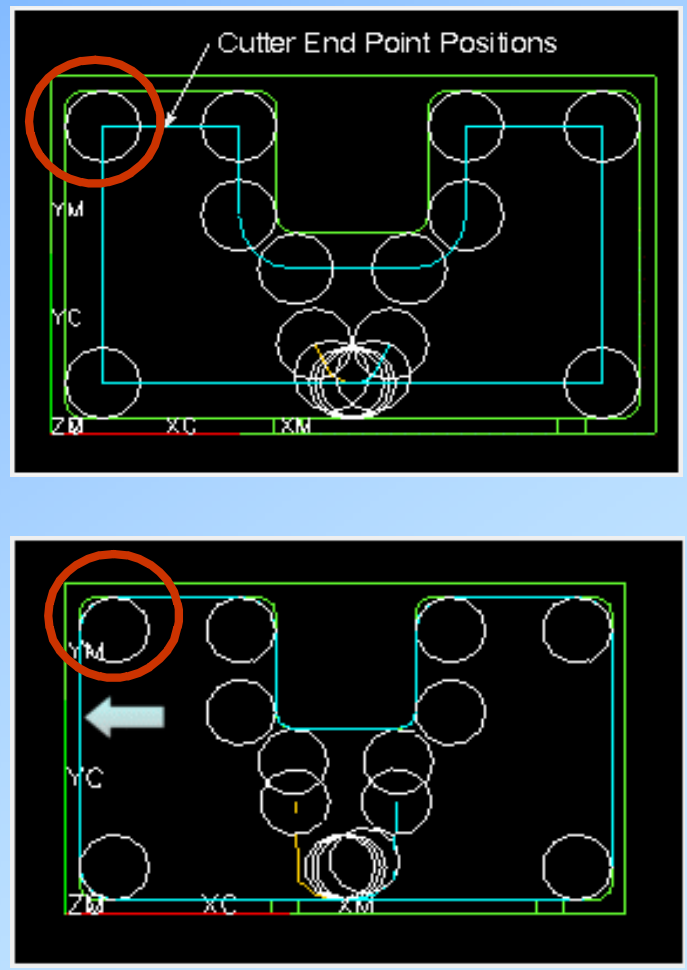
TOOL NAME	DESCRIPTION	DIAMETER
UGT0203_010	Ball End 40 mm	40.0000
UGT0203_009	Ball End 50 mm	50.0000
UGT0203_009	Ball End 50 mm	50.0000

CAM OPERASYONLARI YENİLİKLERİ

Output Contact Data

Planar Profile operasyonları altında bulunan bu özellik, sadece takım yolunun duvar boyunca veya sınır sonlarında değil; tüm temas noktalarında gösterilmesi için kullanılır.

Takım yolu, takım merkezinde değil; takımın yukarıda belirtilen temas noktalarında gösterilir.



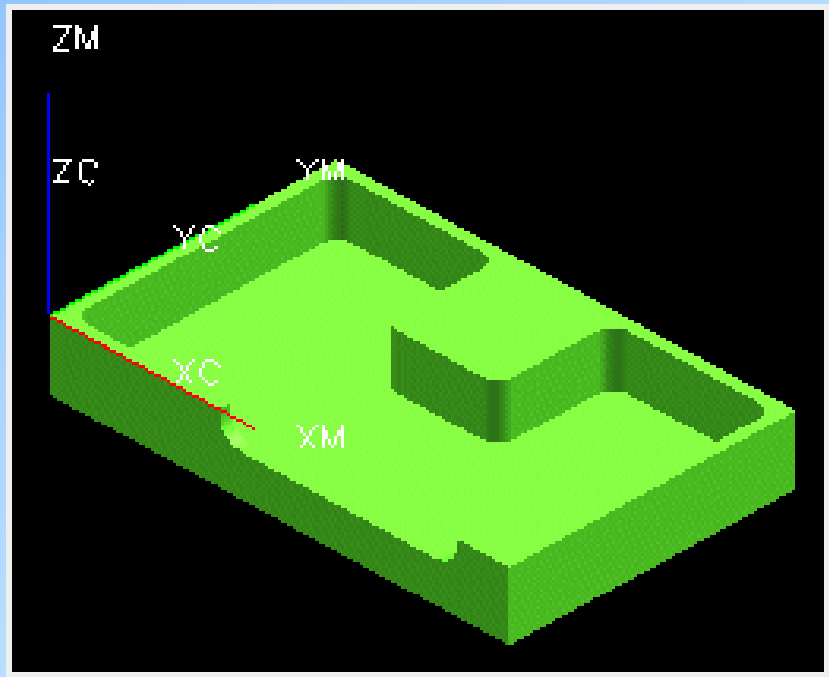
CAM OPERASYONLARI YENİLİKLERİ

Output Contact Data

UYGULAMA 1:

Örnek Parça : move2nx_contact_data.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

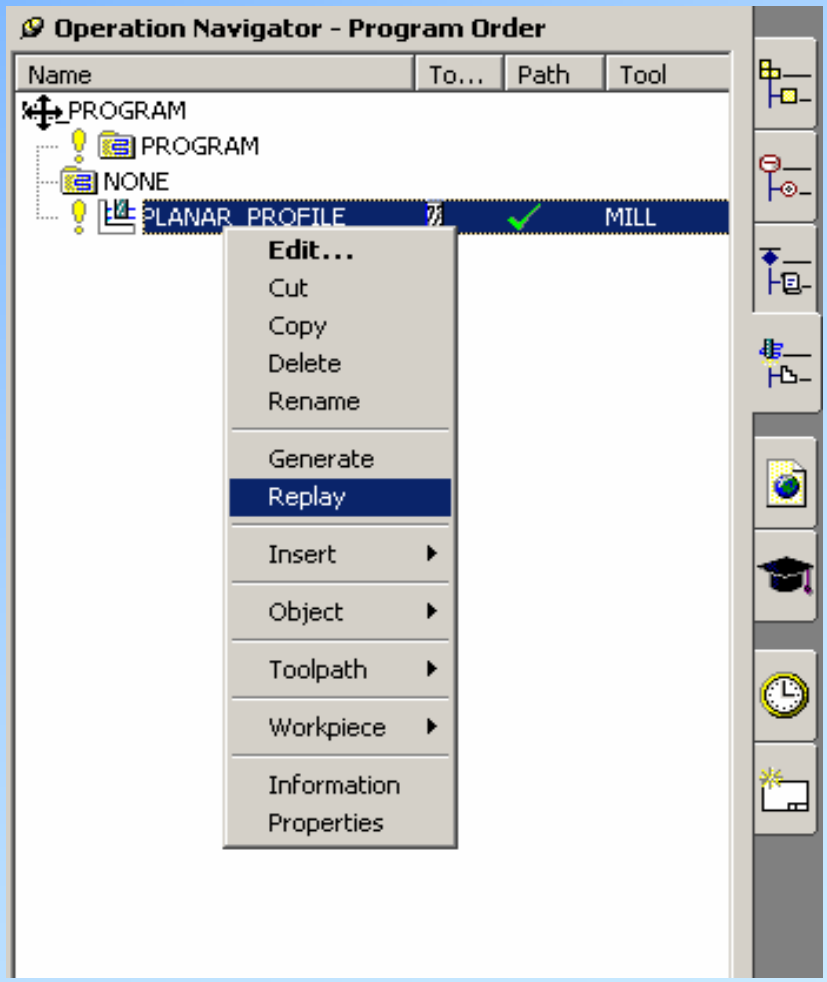
Output Contact Data

Operation Navigator

PLANAR_PROFILE

MB3

Replay



CAM OPERASYONLARI YENİLİKLERİ

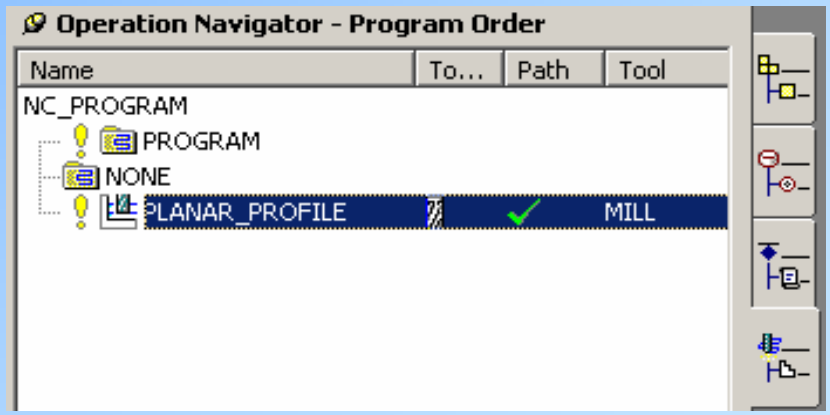
Output Contact Data

Operation Navigator

PLANAR_PROFILE

MB1

Double Click



CAM OPERASYONLARI YENİLİKLERİ

Output Contact Data

Machine

↓

Cutter Compensation

↓

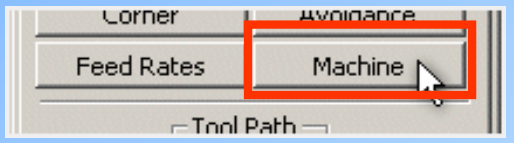
Output Contact Data

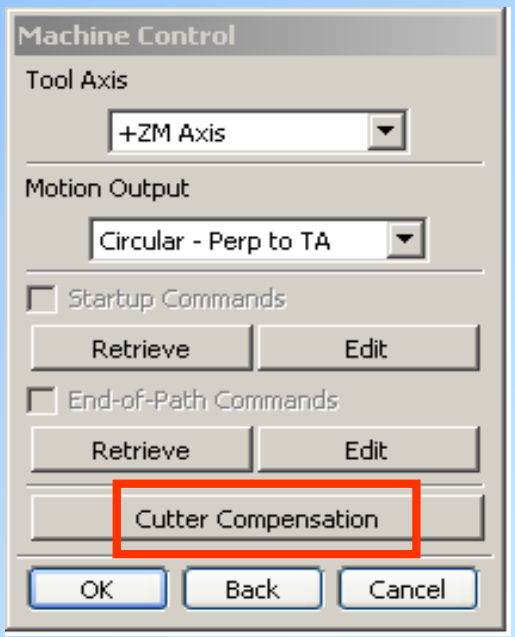
↓

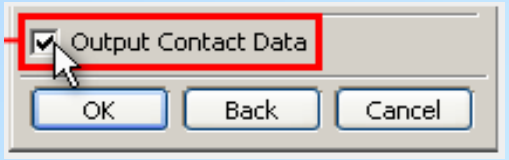
OK

↓

Generate







CAM OPERASYONLARI YENİLİKLERİ

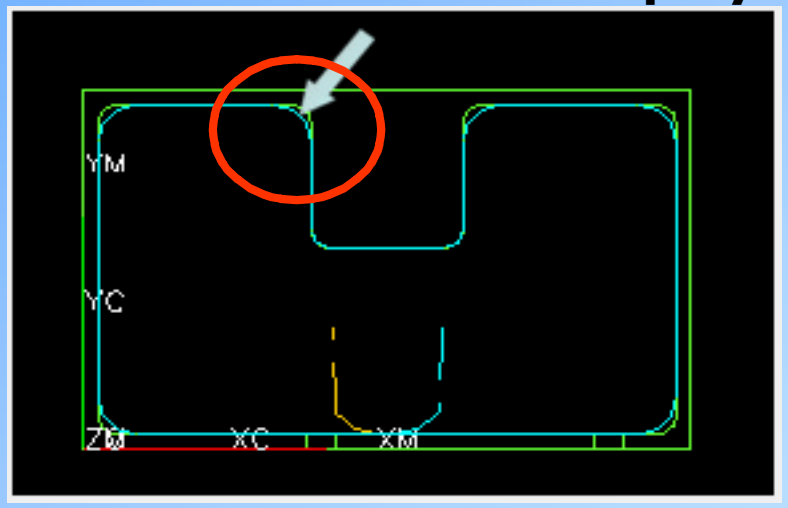
Output Contact Data

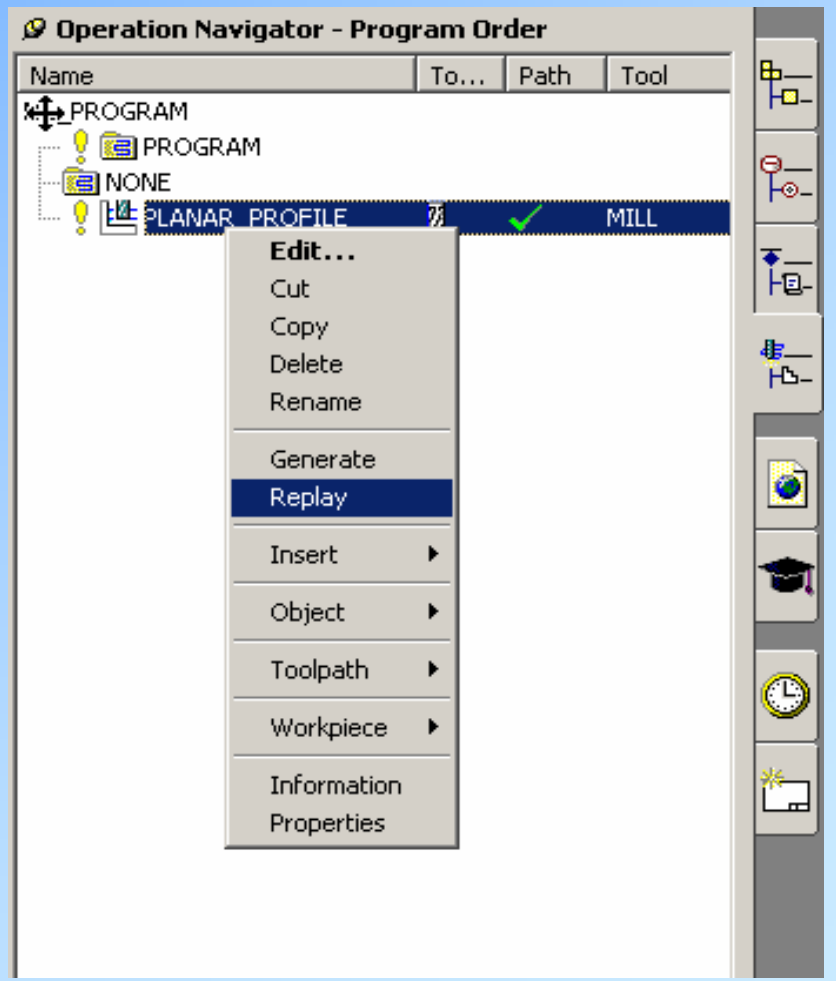
Operation Navigator

PLANAR_PROFILE

MB3

Replay



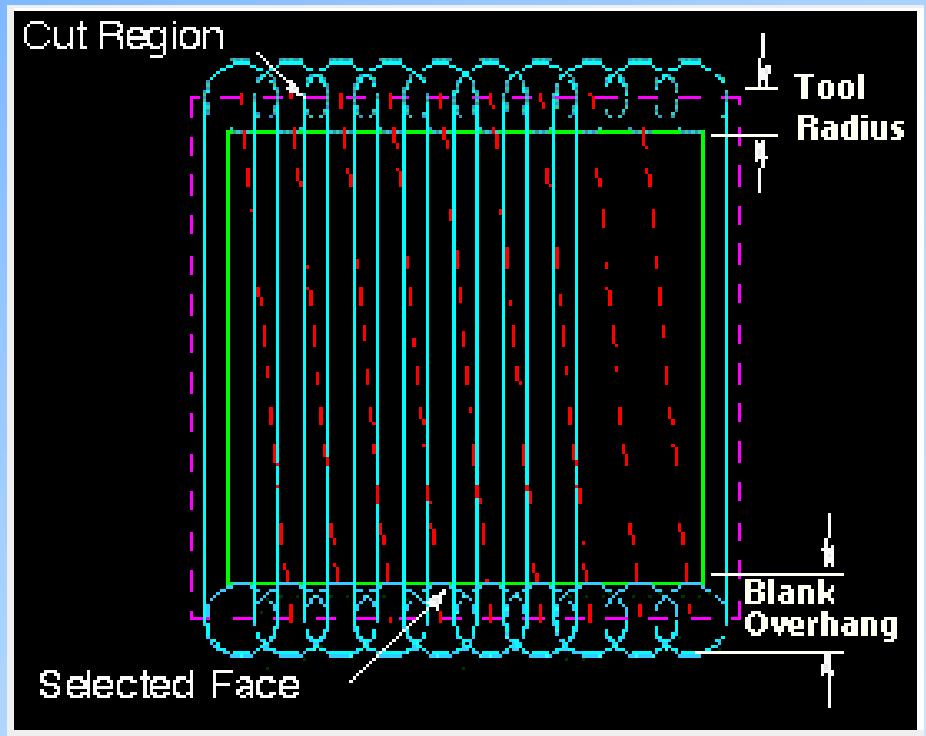


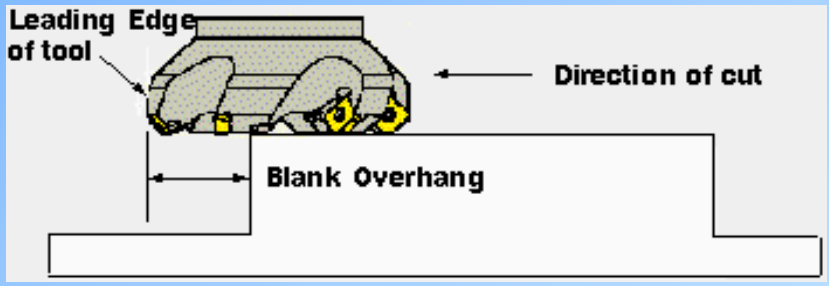
CAM OPERASYONLARI YENİLİKLERİ

Face Milling - Blank Overhang

Bu geliştirme ile takımın parça dışına çıkma mesafesi (Blank Overhang) ayarlanabilmektedir.

Seçilen katı yüzünden itibaren, takım çapıyla ifade edilen yüzde kadar takım yolu uzatılabilmektedir.





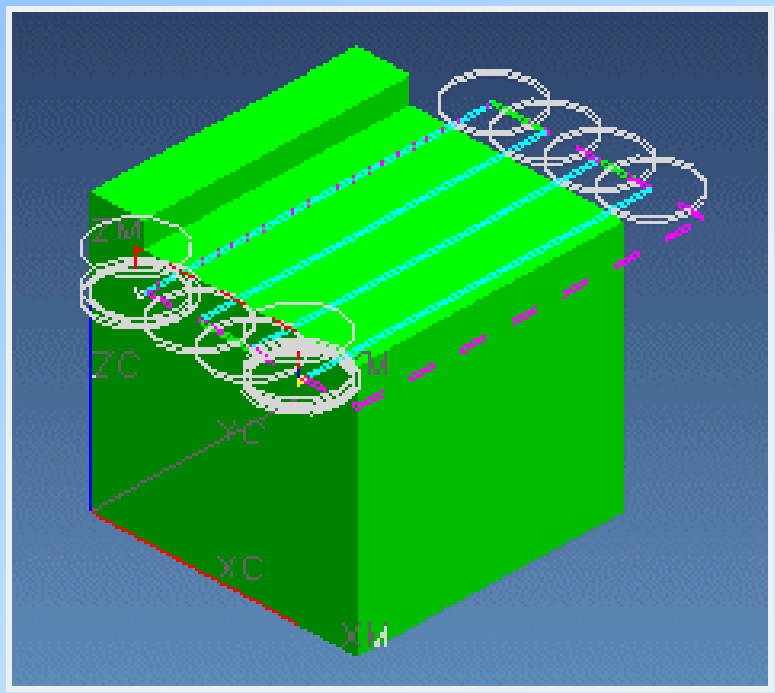
CAM OPERASYONLARI YENİLİKLERİ

Face Milling - Blank Overhang

UYGULAMA 2:

Örnek Parça : move2nx_face_mill.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

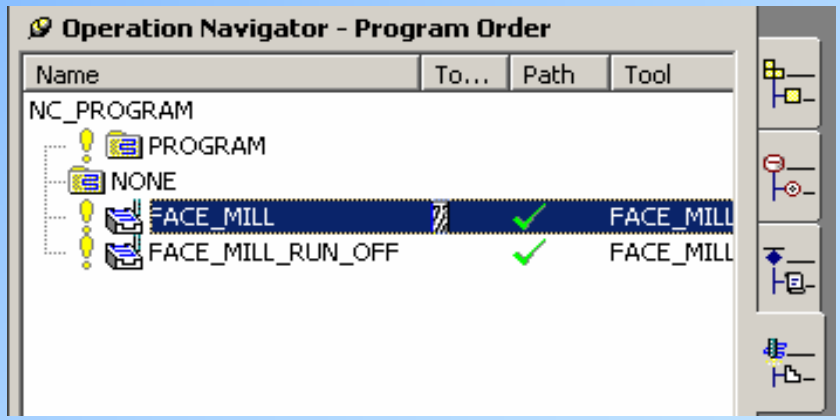
Face Milling - Blank Overhang

Operation Navigator

FACE_MILL

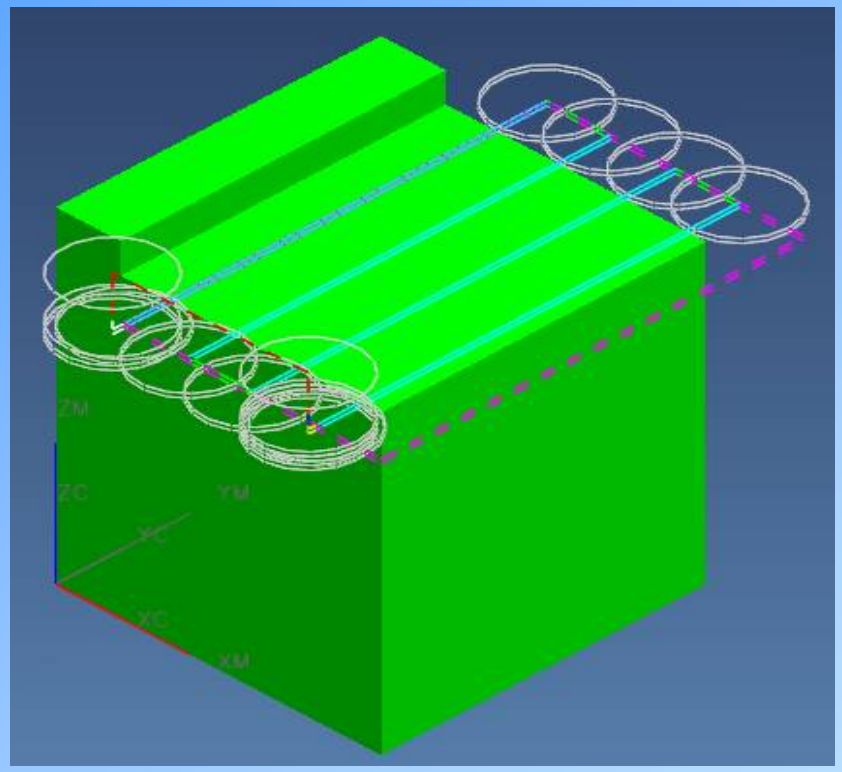
MB1

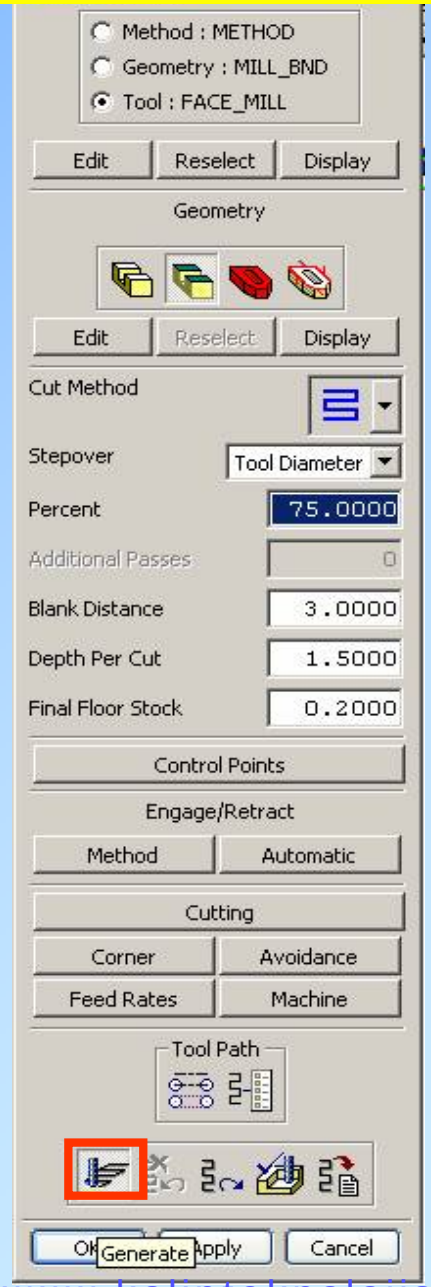
Double Click



CAM OPERASYONLARI YENİLİKLERİ

Face Milling - Blank Overhang





CAM OPERASYONLARI YENİLİKLERİ

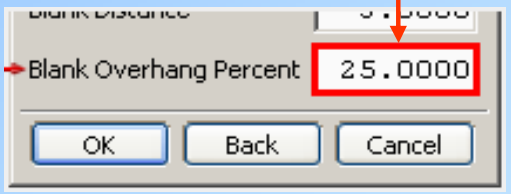
Face Milling - Blank Overhang

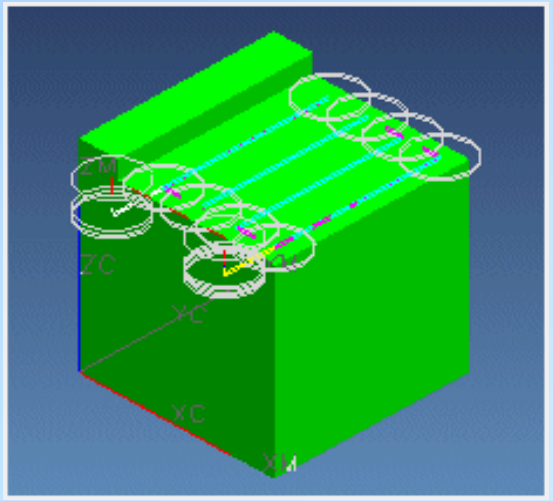
Cutting

Blank Overhang

OK

Generate

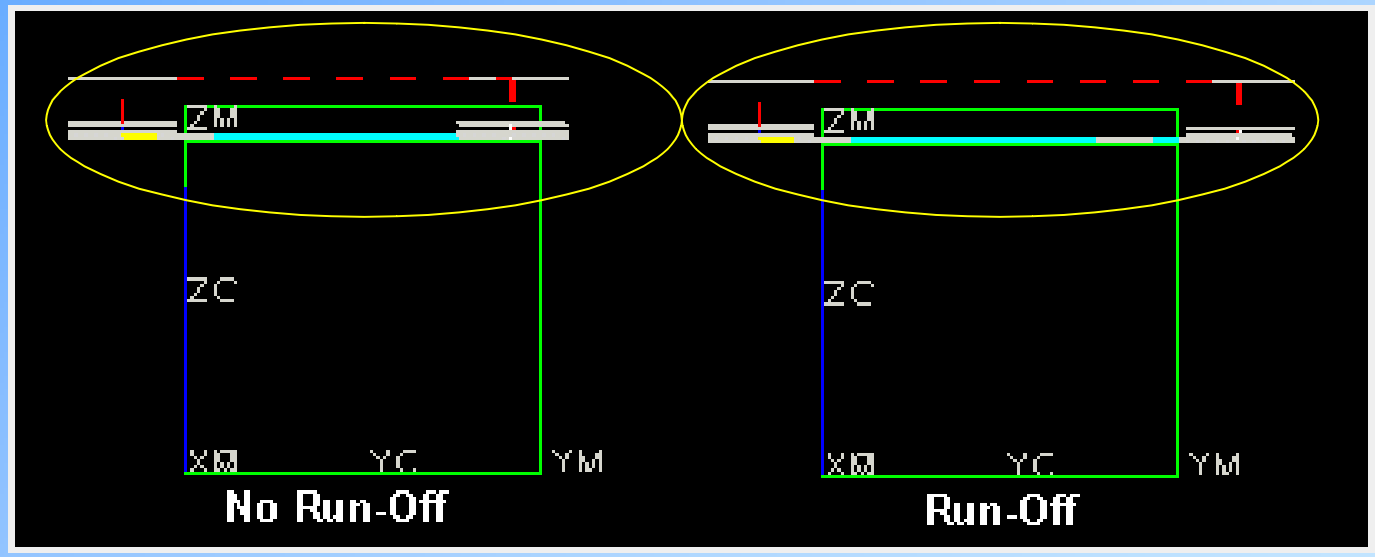


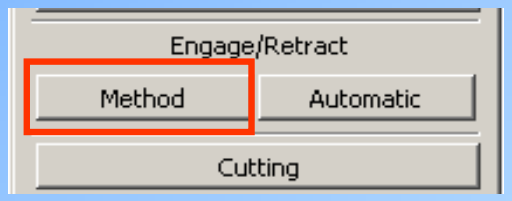


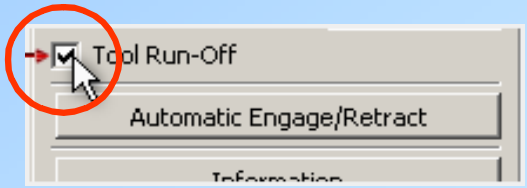
CAM OPERASYONLARI YENİLİKLERİ

Face Milling - Tool Run-Off

Zig veya Zig-Zag yöntemlerinin kullanıldığı operasyonlarda, takımın boşta geçirdiği zamanı minimum seviyeye indirmek için kullanılır.





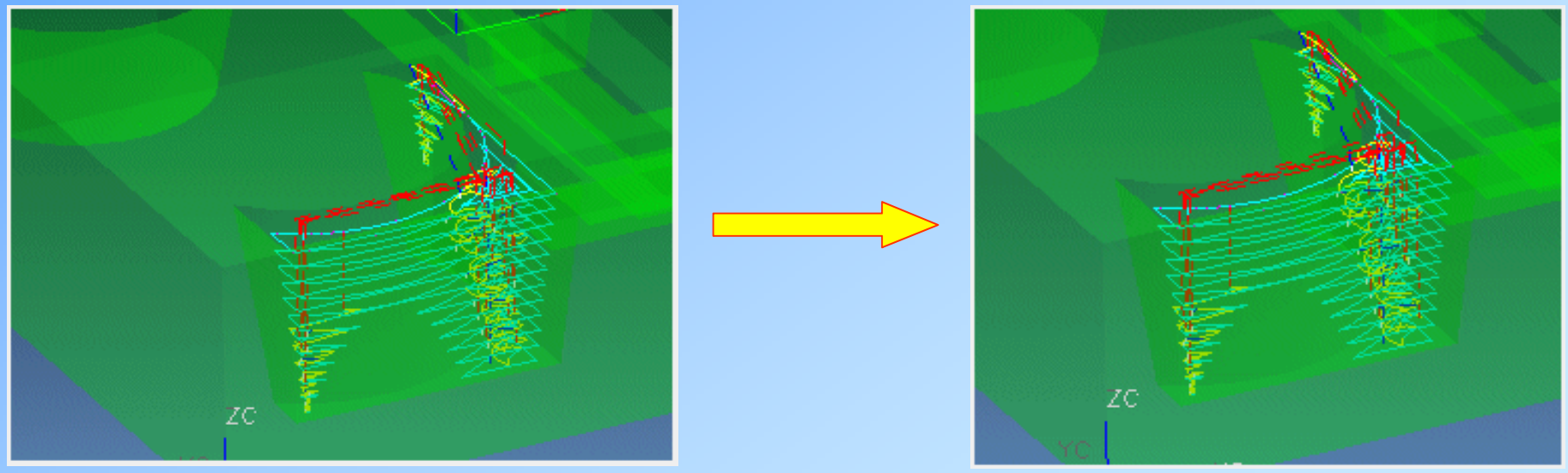


CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

Controlling Automatic Engages Directly Into Material

Takımın parçaya girişi esnasında meydana gelebilecek aşınmaları en alt seviyeye indirmek için geliştirilen yöntemler arasında en çok tercih edileni helisel olarak parçaya giriş yöntemidir.

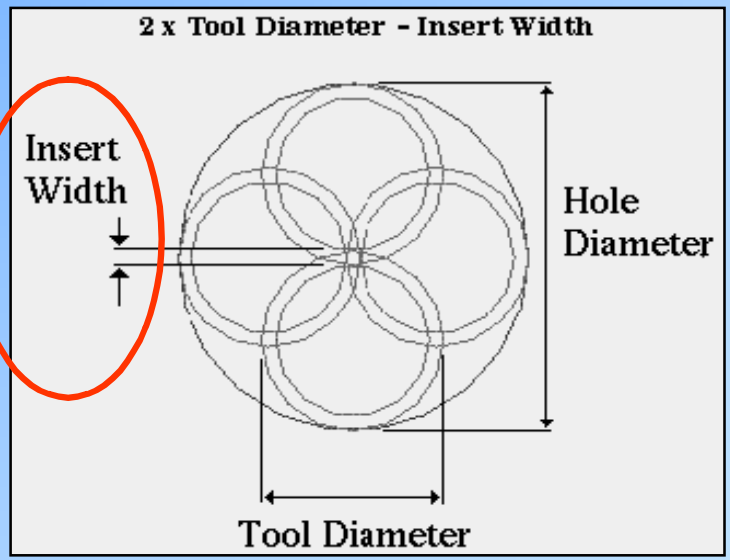


CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

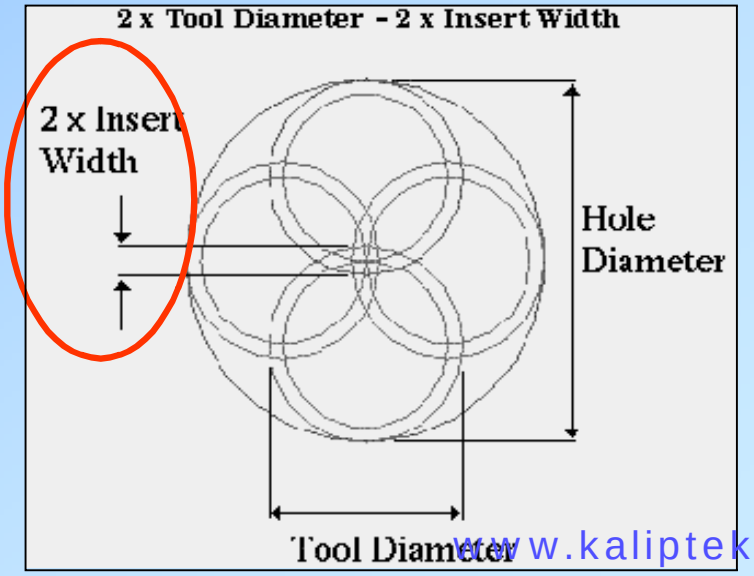
Controlling Automatic Engages Directly Into Material

MAX. Helis Çapı



Helisel metodun kullanımı esnasında max. ve min. delik çapları mevcuttur.

MIN. Helis Çapı

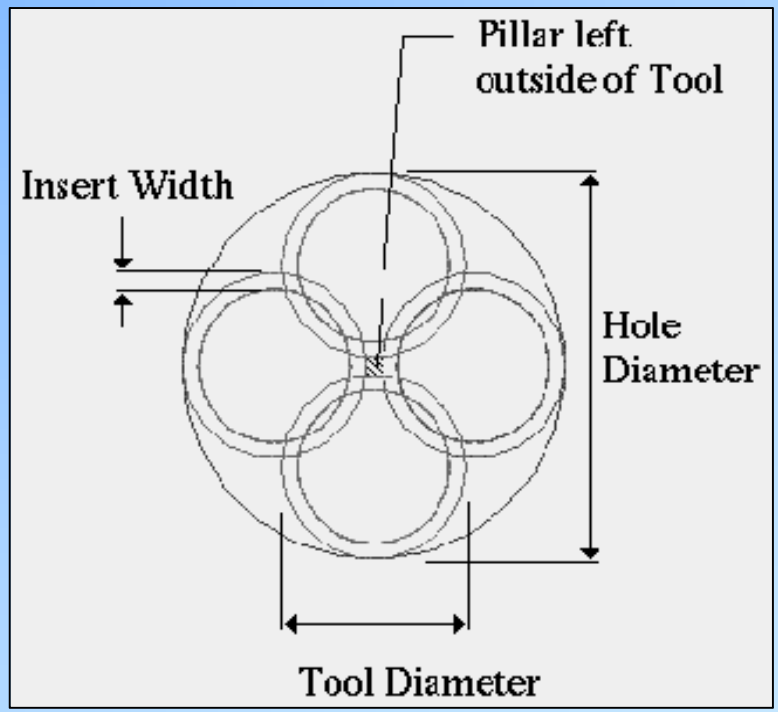


CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

Controlling Automatic Engages Directly Into Material

Verilen Helis çapı, takım çapının iki katından fazlaysa; ortada parça kalacağından dolayı takım kırılmalarına neden olabilir.

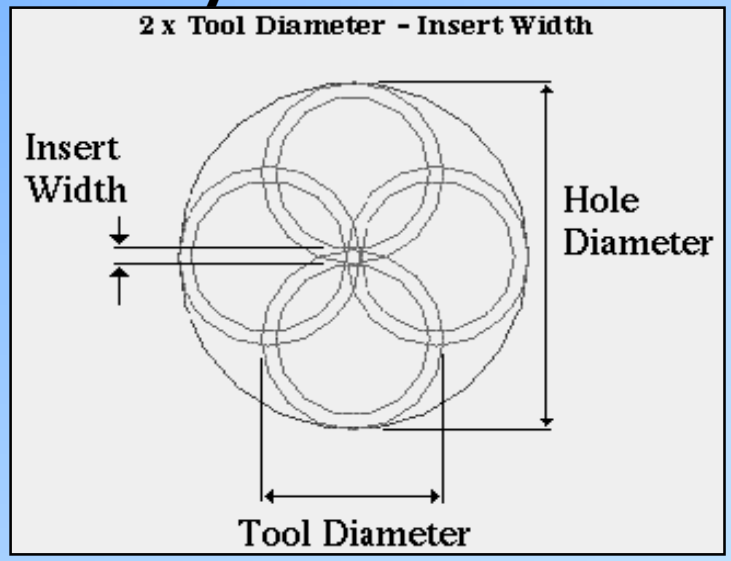


CAM OPERASYONLARI YENİLİKLERİ

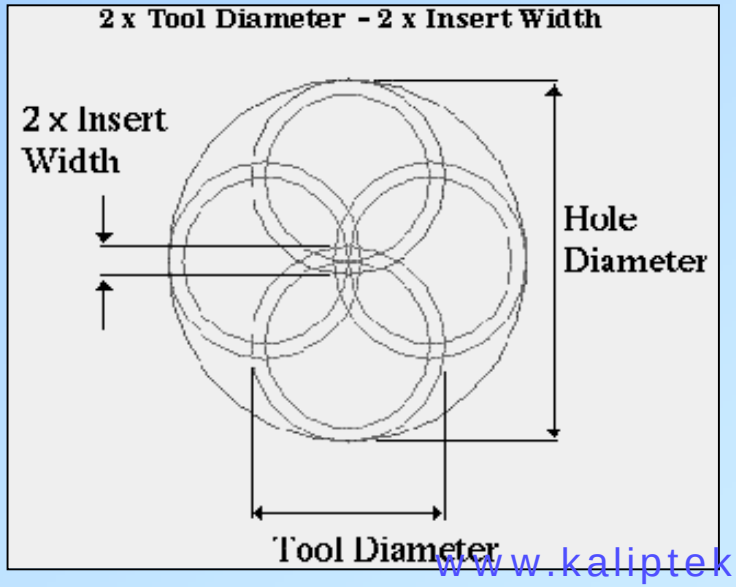
Face Milling-

Controlling Automatic Engages Directly Into Material

Oluşan delik çapı hesaplanan minimum delik çapına eşit olması durumunda, ortamda parça kalmaz ve giriş işlemi sağlıklı olarak gerçekleşir.



Oluşan delik çapı hesaplanan maximum delik çapına eşit olması durumunda, delik tabanı tamamen düz olacaktır.



CAM OPERASYONLARI YENİLİKLERİ

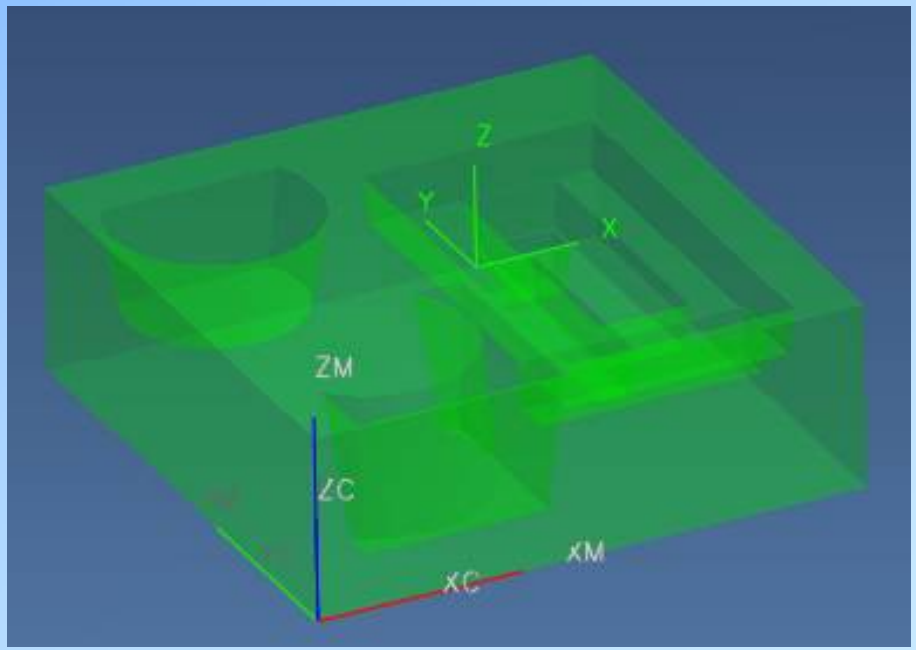
Face Milling-

Controlling Automatic Engages Directly Into Material

UYGULAMA 3:

Örnek Parça : move2nx_engage.prt

Application ⟶ Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

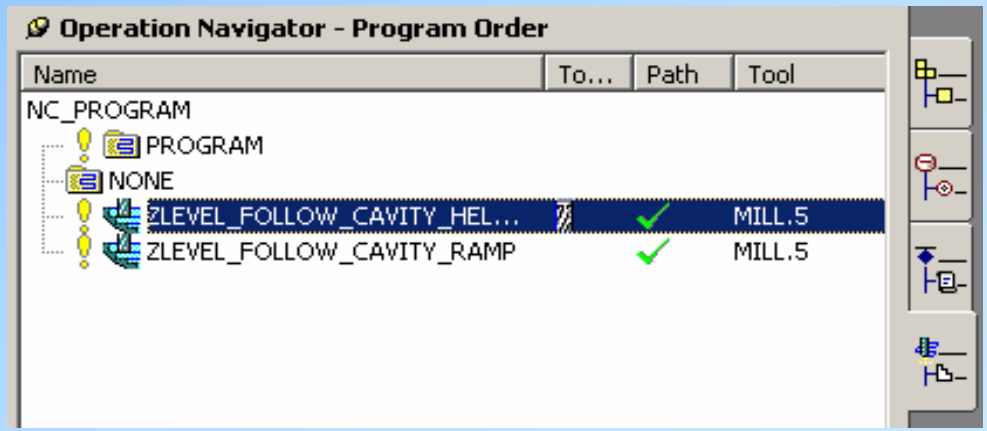
Controlling Automatic Engages Directly Into Material

Operation Navigator

ZLEVEL_FOLLOW_CAVITY_HELICAL

MB1

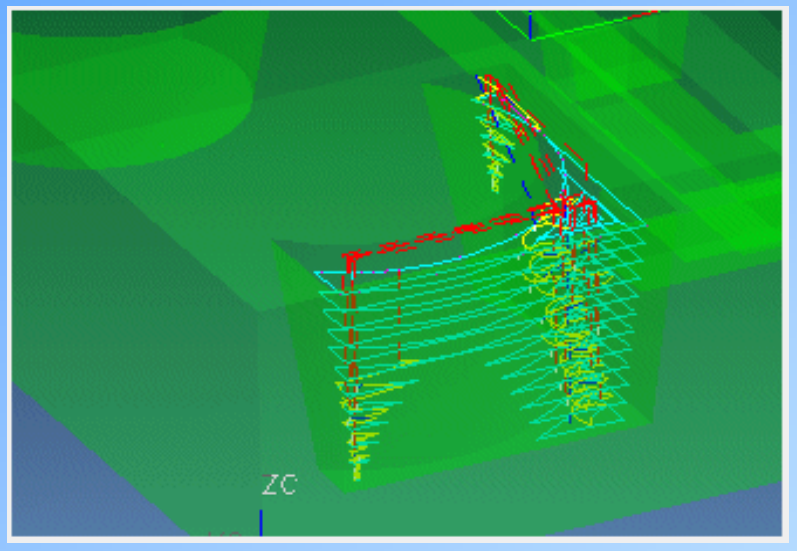
Double Click

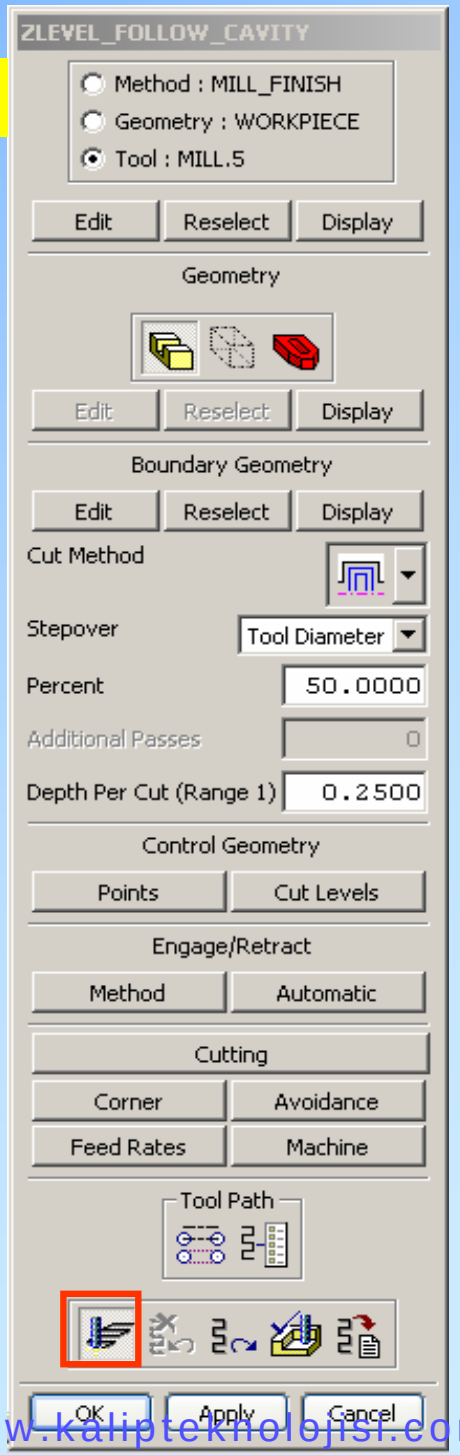


CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

Controlling Automatic Engages Directly Into Material





CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

Controlling Automatic Engages Directly Into Material

Automatic

⇩

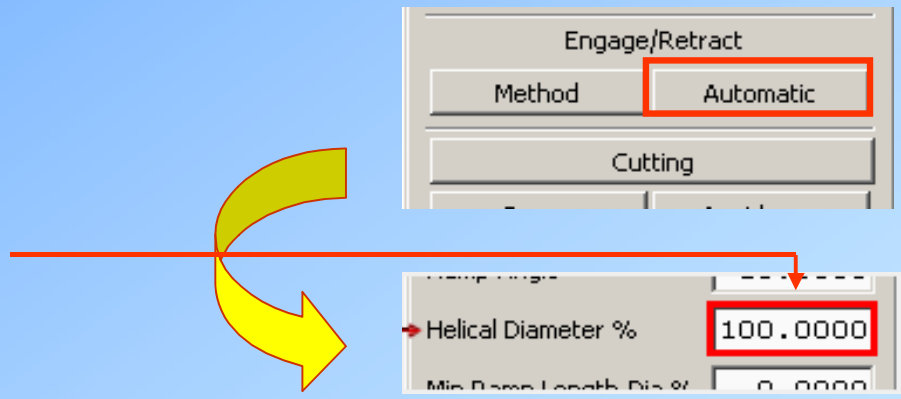
Helical Diameter %:100.000

⇩

OK

⇩

Generate

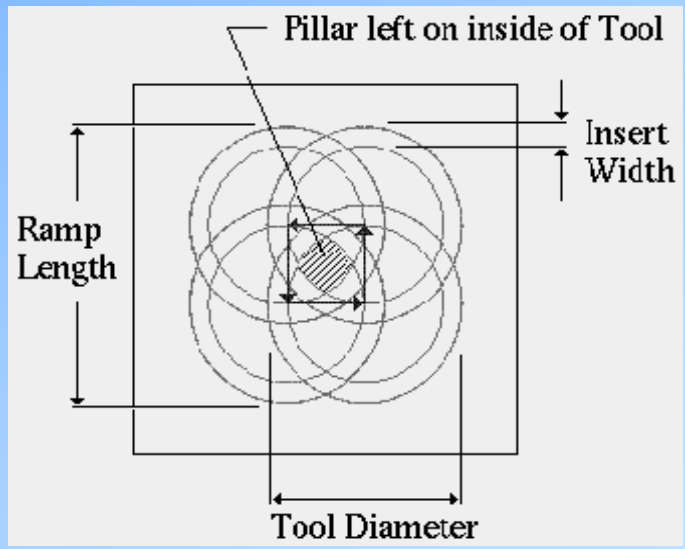


CAM OPERASYONLARI YENİLİKLERİ

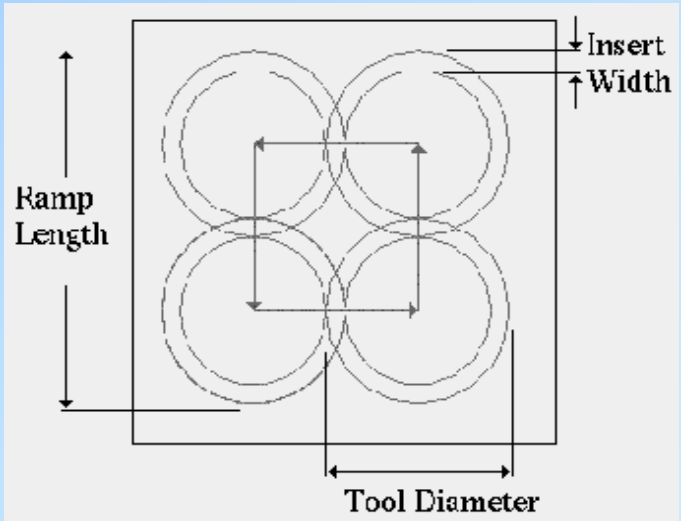
Face Milling-

Controlling Automatic Engages Directly Into Material

Oluşan rampanın boyu hesaplanandan küçük olursa merkezde parça kalacak ve bu da, takımın kırılmasına neden olacaktır.



Oluşan rampanın boyu hesaplanan ile eşit veya büyük ise, parçaya sağlıklı bir giriş sağlanacaktır.



CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

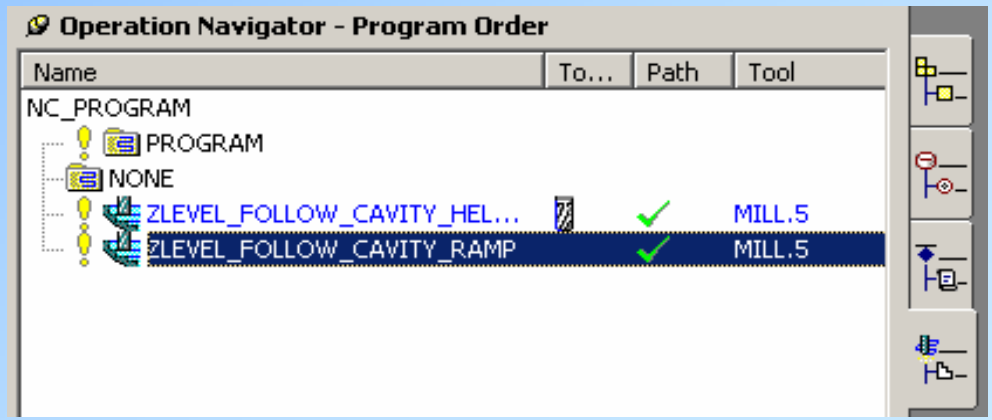
Controlling Automatic Engages Directly Into Material

Operation Navigator

ZLEVEL_FOLLOW_CAVITY_RAMP

MB1

Double Click



CAM OPERASYONLARI YENİLİKLERİ

Face Milling-

Controlling Automatic Engages Directly Into Material

UYGULAMA 3 Devamı:

Automatic

↓

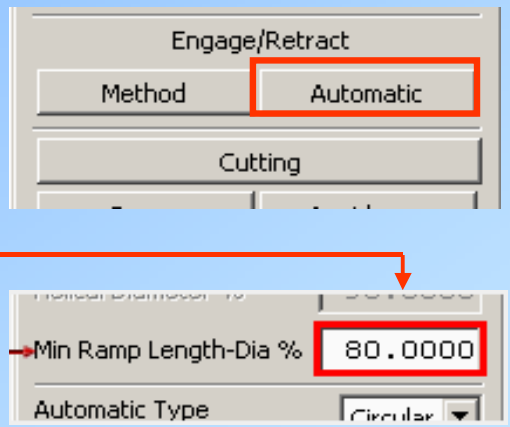
Min Ramp Length-Dia%:80.00

↓

OK

↓

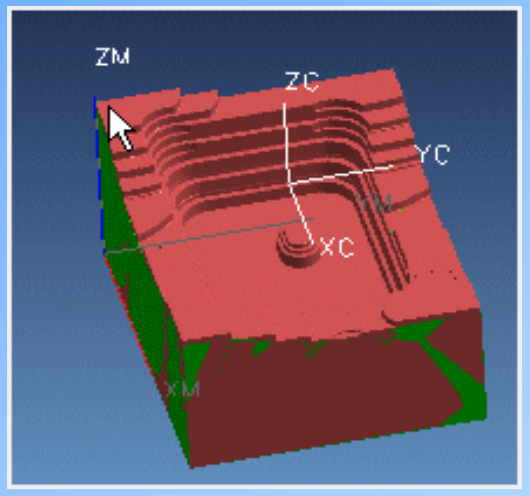
Generate

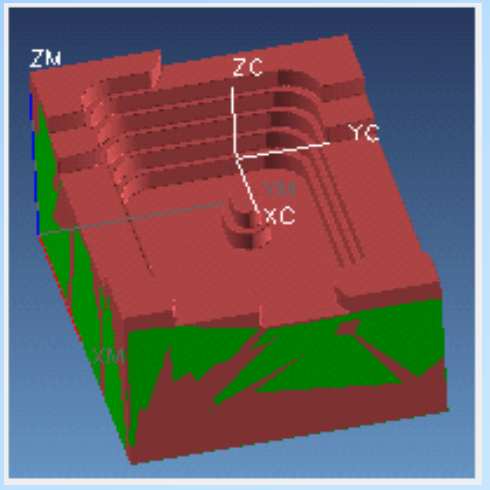


CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

UG NX versiyonuyla birlikte; önceki işlemden kalan ve Faceted Body olarak da adlandırılan işlenmemiş kısımları otomatik olarak işlemek mümkün olmaktadır.





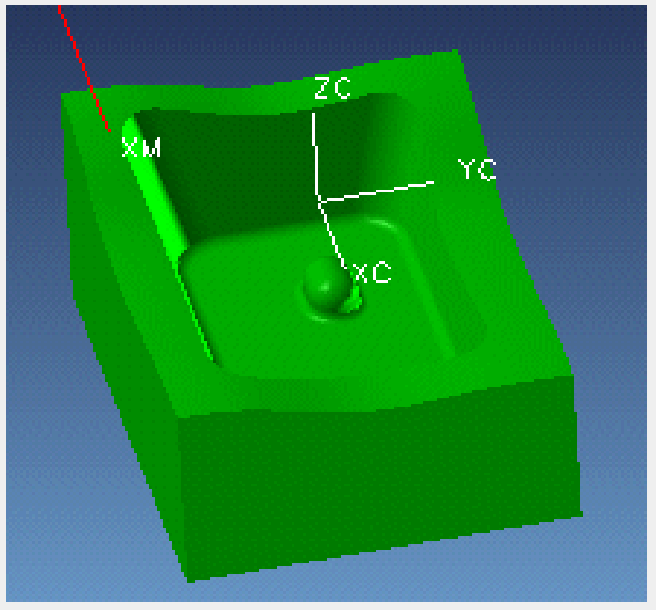
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

UYGULAMA 4:

Örnek Parça : move2nx_3d_ipw.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

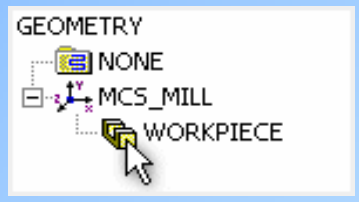
Operation Navigator

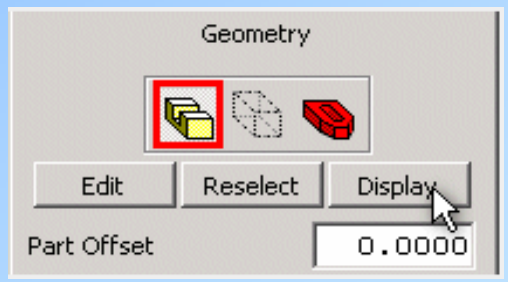
↓

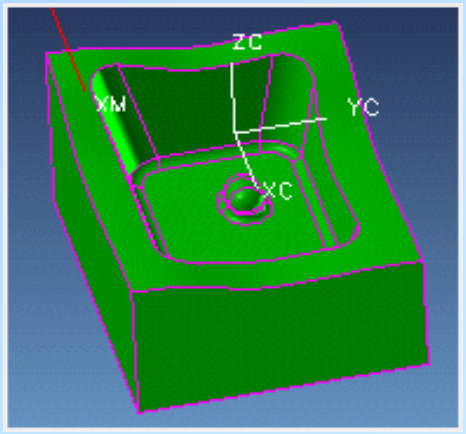
WORKPIECE

↓

Part → **Display**







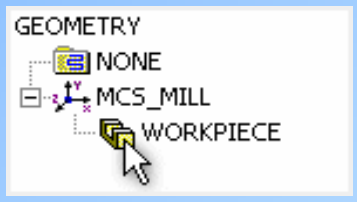
CAM OPERASYONLARI YENİLİKLERİ

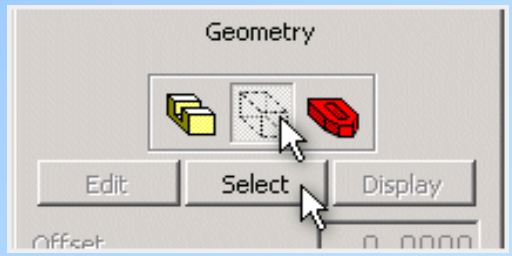
In-Process Work Piece for Fixed Axis Milling

Operation Navigator

WORKPIECE

Blank → Select

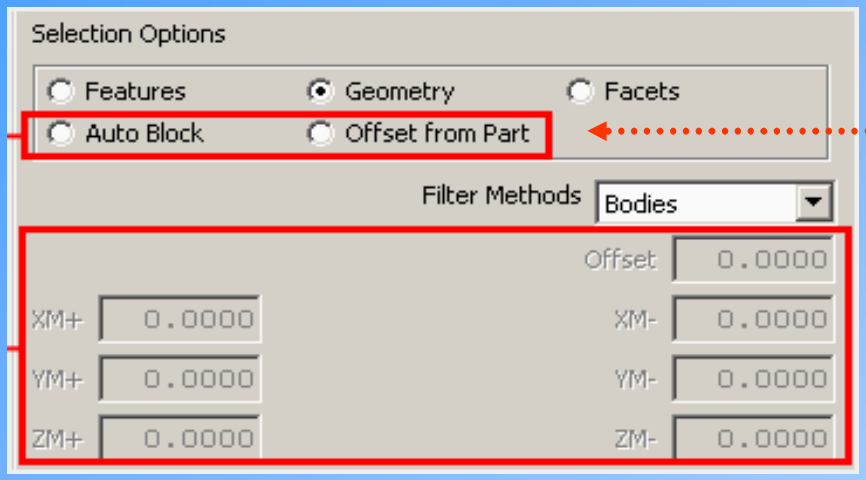




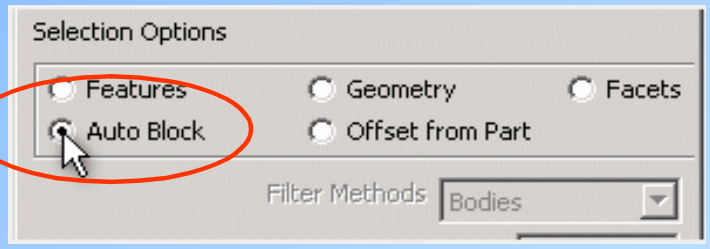
Bu kısımda yeni eklenen blank özellikleri belirmektedir.

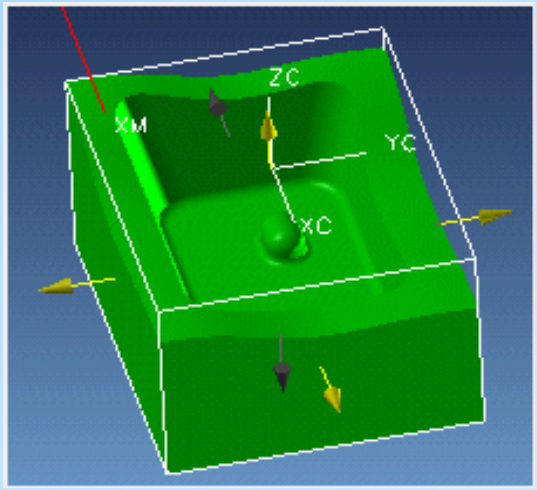
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling



Yeni Özellikler



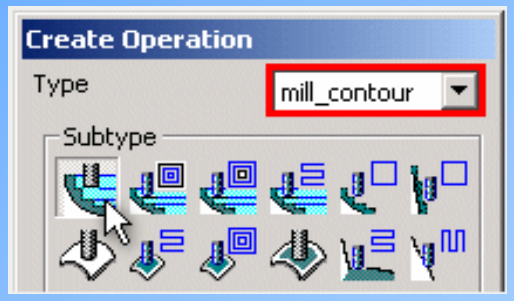


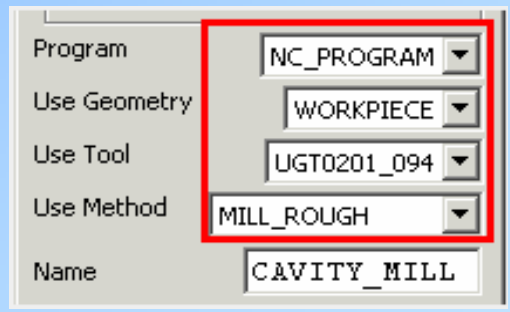
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

Kaba İşleme :

Create Operation





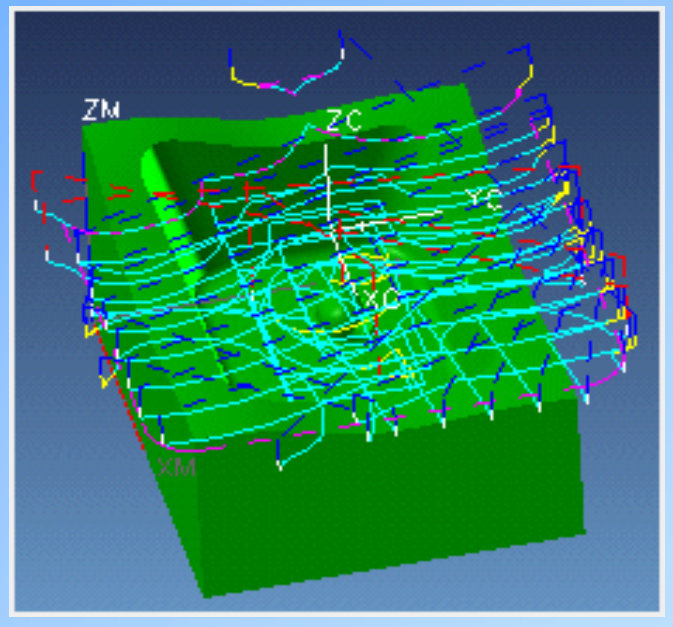
OK

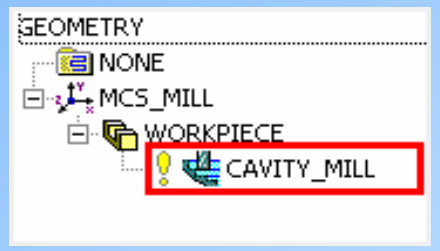
CAM OPERASYONLARI YENİLİKLERİ

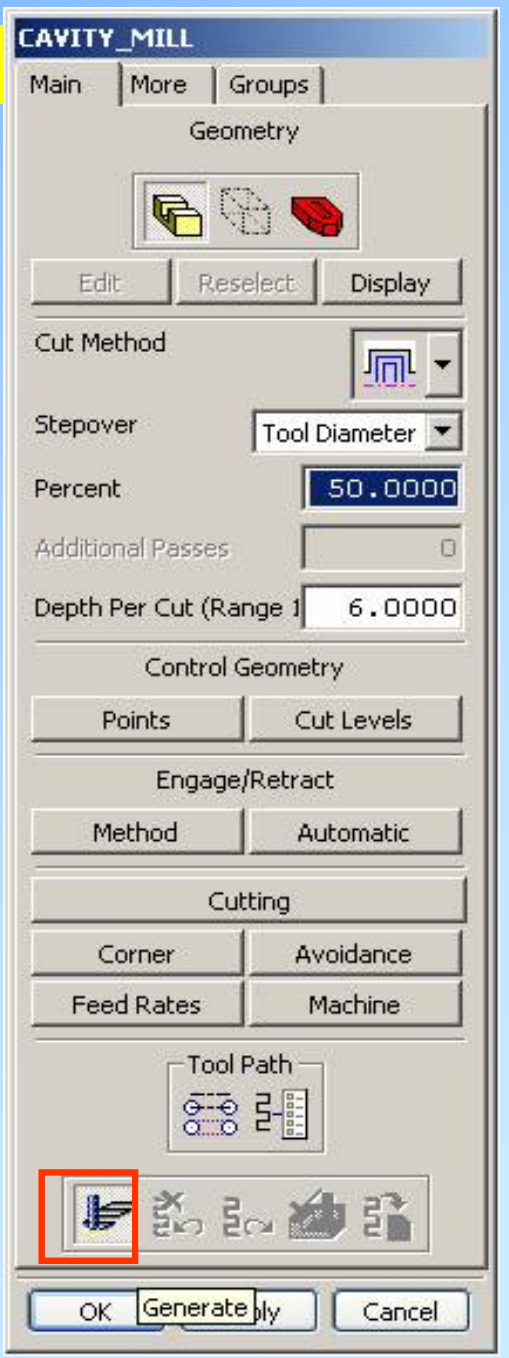
In-Process Work Piece for Fixed Axis Milling

Generate

OK





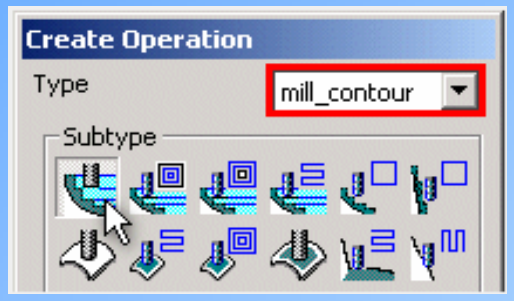


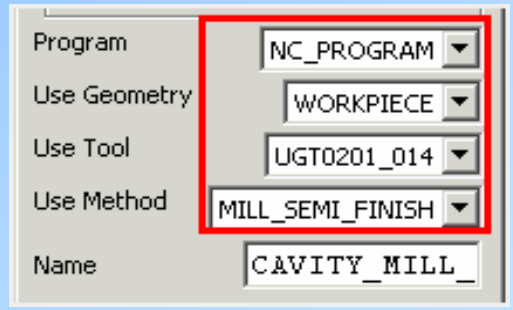
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

Yarı Hassas İşleme :

Create Operation





OK

CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

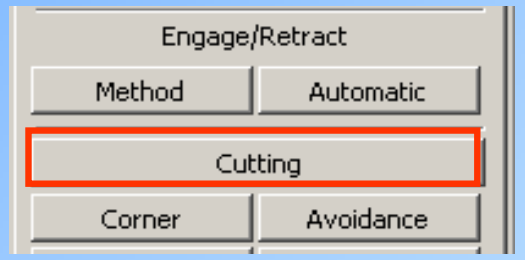
Cutting

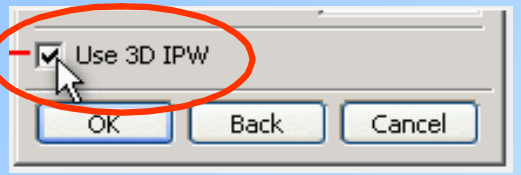
Use 3D IPW

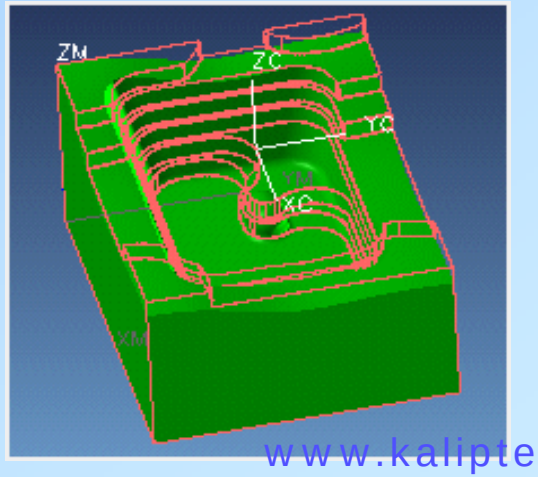
OK

Previous IPW

Display

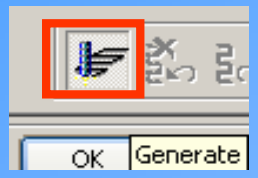




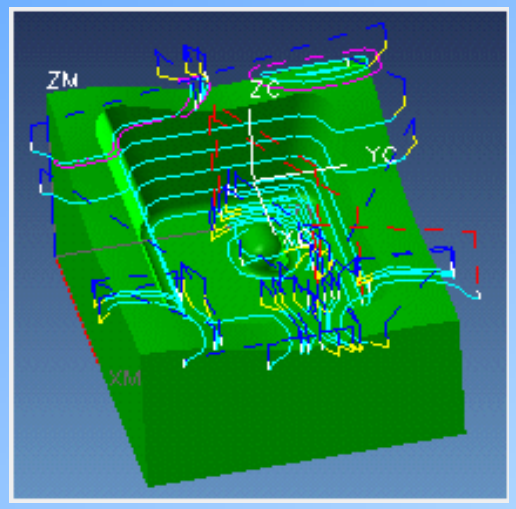


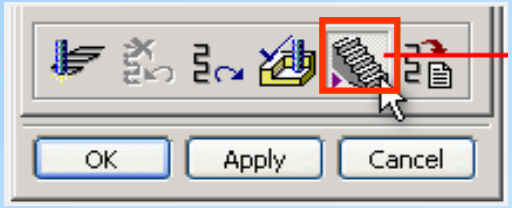
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

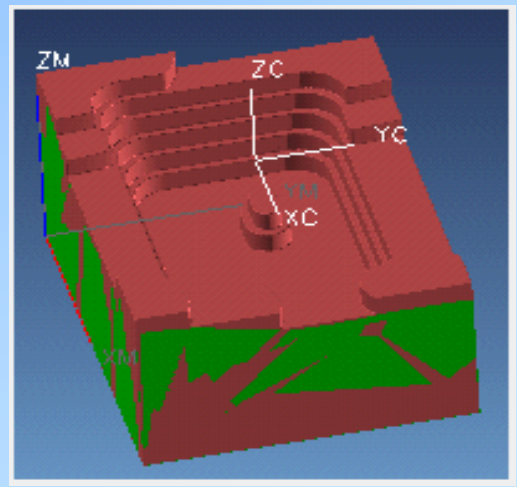


Generate





Display Resulting IPW

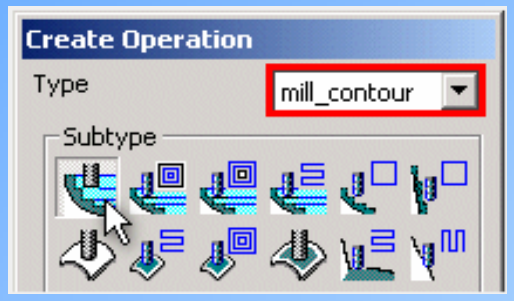


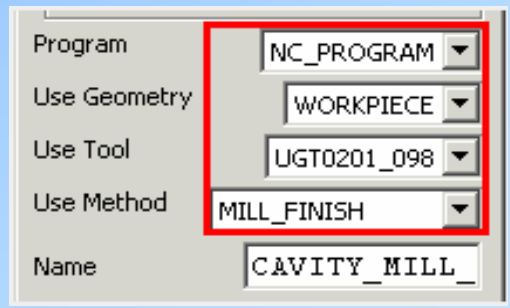
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

Hassas İşleme :

Create Operation





OK

CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

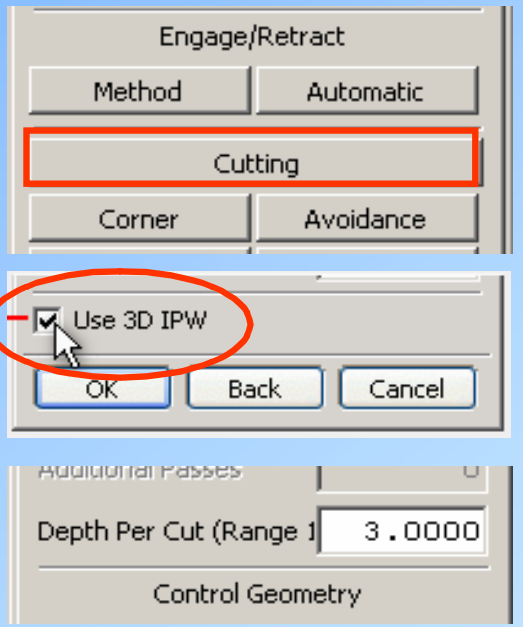
Cutting

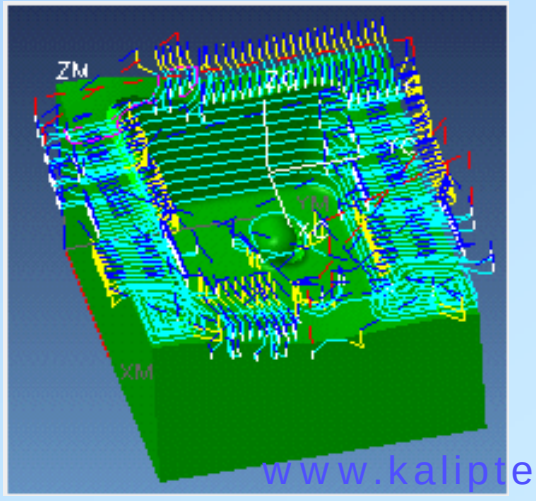
Use 3D IPW

OK

Depth Per Cut :3.000

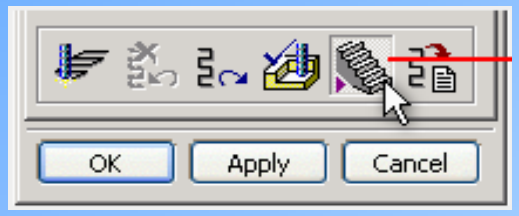
Generate



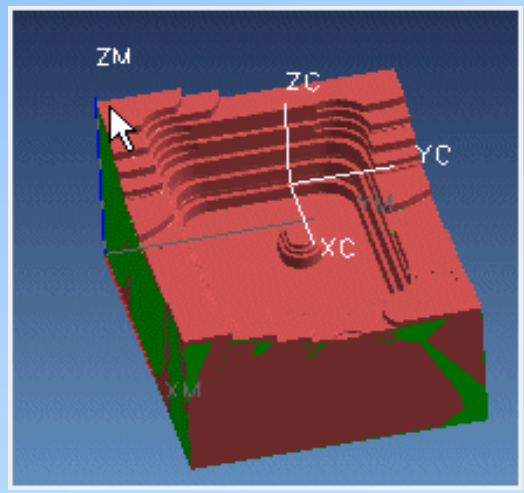


CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling



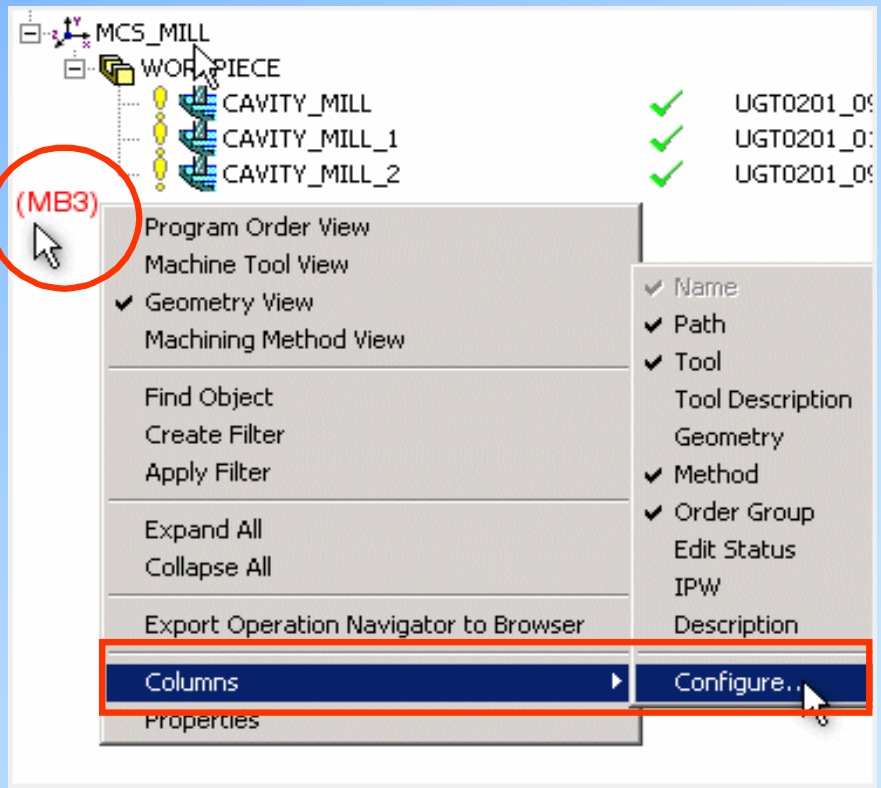
Display Resulting IPW

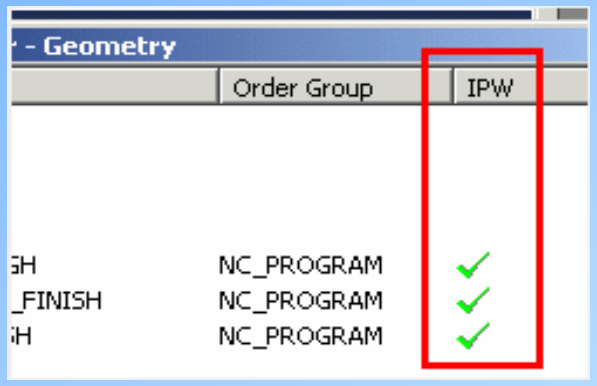


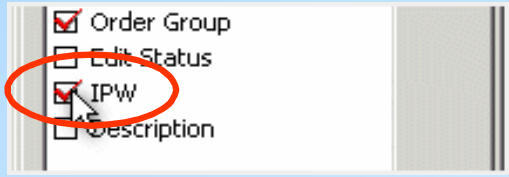
CAM OPERASYONLARI YENİLİKLERİ

In-Process Work Piece for Fixed Axis Milling

Operation Navigator üzerinde IPW ile ilgili işlemler yapılabilir.







CAM OPERASYONLARI YENİLİKLERİ

High Speed Milling

Yüksek hızda kesim yapabilmek için;

Sabit Talaş Derinliği,

Yüksek Spindle Hızı,

Yüksek Kesme Hızları,

Yumuşak Takım Yolu Hareketleri

gibi birçok kriterin sağlıklı olarak sağlanması gerekmektedir.

Bu koşulları sağlıklı olarak yaratabilmek için UG NX içerisinde, Z Level operasyonlar içerisinde yenilikler eklenmiştir.

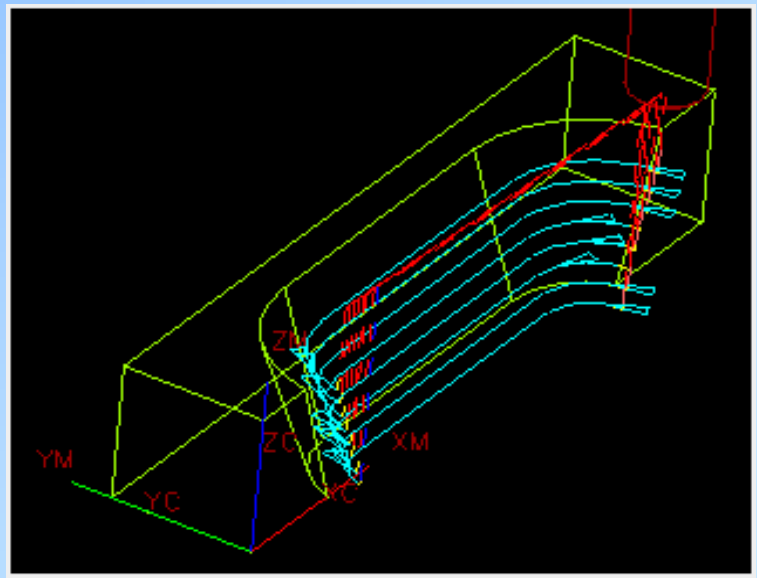
CAM OPERASYONLARI YENİLİKLERİ

High Speed Milling

UYGULAMA 5:

Örnek Parça : move2nx_hsm.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

High Speed Milling

Operation Navigator

⇩

ZLEVEL_PROFILE

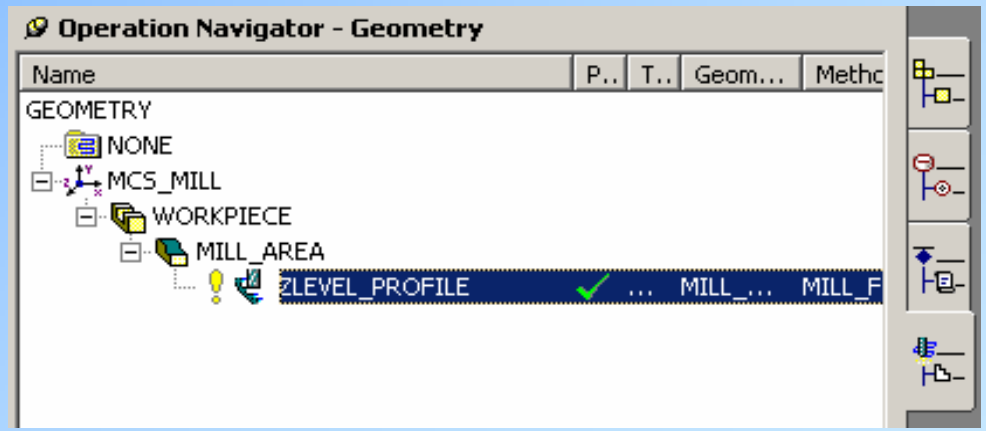
⇩

MB1

Double Click

⇩

Replay

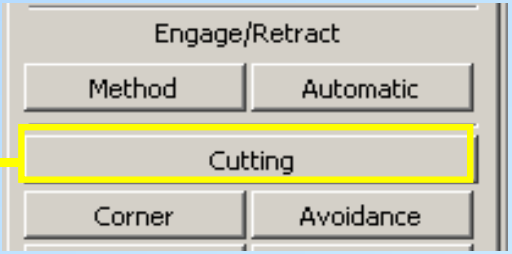


CAM OPERASYONLARI YENİLİKLERİ

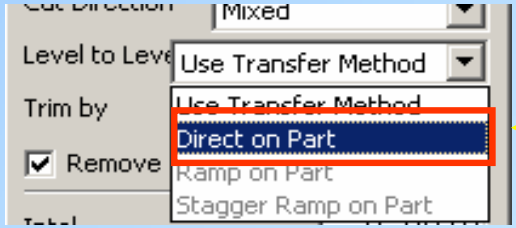
High Speed Milling

Cutting

Cut Direction → **Mixed**



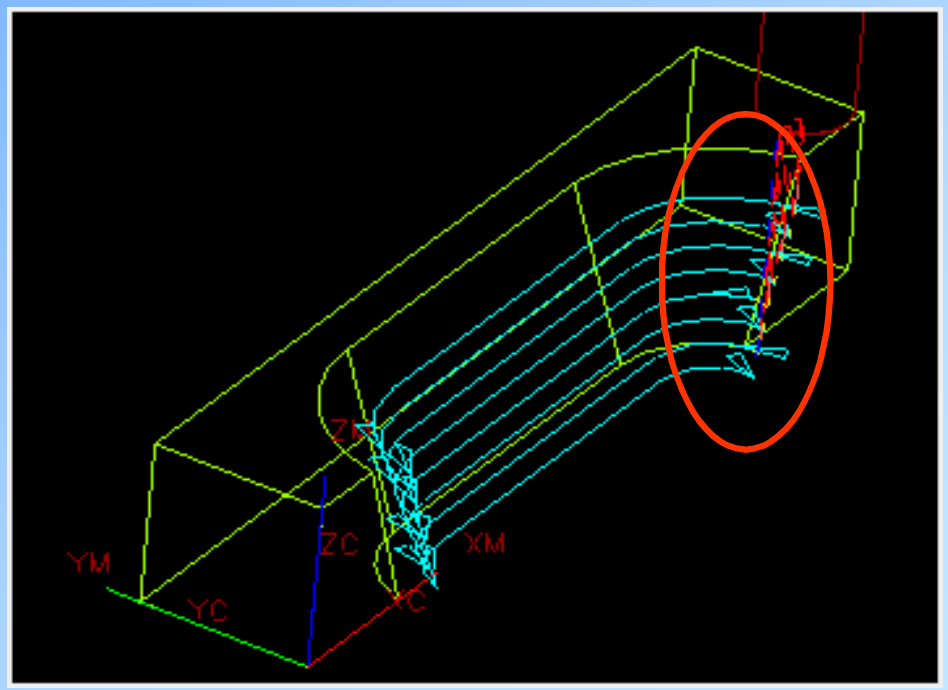
Level to Level → **Direct on Part**



CAM OPERASYONLARI YENİLİKLERİ

High Speed Milling

OK → Generate



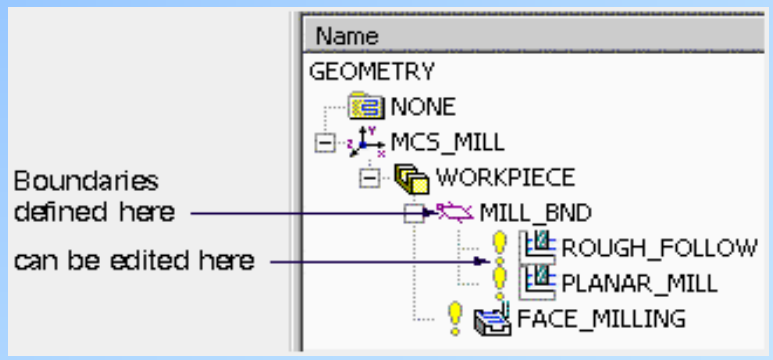
CAM OPERASYONLARI YENİLİKLERİ

Custom Boundary Data for Milling

Geometri grupları içerisinde belirlenen Boundary, adını verdiğimiz sınır eğrileri üzerinde değiştirme işlemleri yapılabilmektedir.

Bu uygulamanın yapılabildiği işlemler:

Face Milling **(Blank and Check Boundaries)** ***Planar Milling*** **(Part, Blank, Check, Trim Boundaries)** ***Cavity Milling*** **(Part, Blank, Check Trim Boundaries)** ***Zlevel Milling*** **(Trim Boundaries)** ***Surface Contouring-Area Milling*** **(Trim Boundaries)**



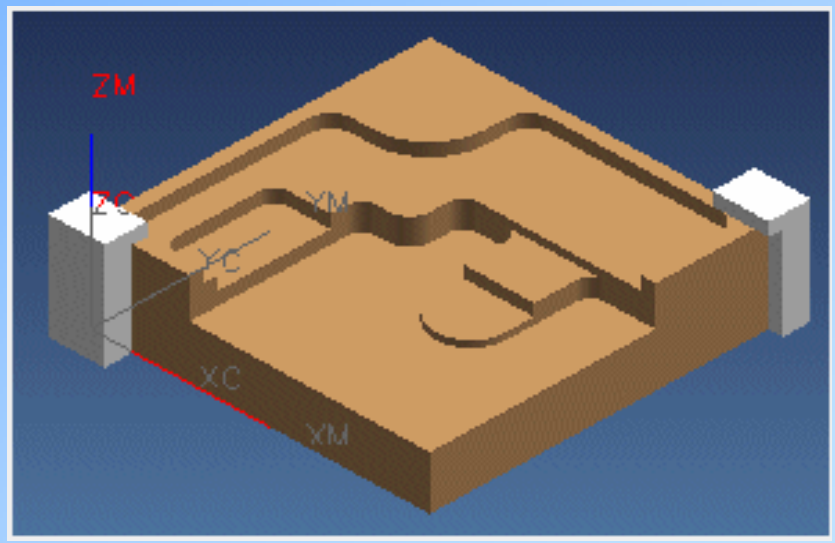
CAM OPERASYONLARI YENİLİKLERİ

Custom Boundary Data for Milling

UYGULAMA 6:

Örnek Parça : move2nx_mill_boundary.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

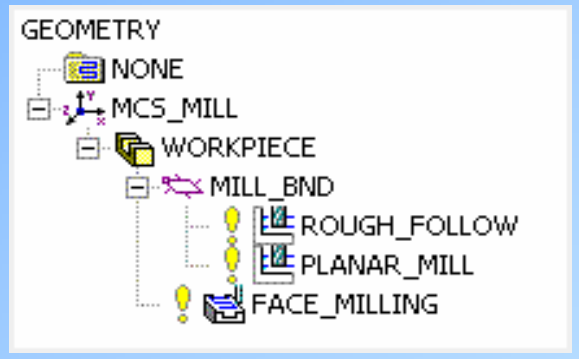
Custom Boundary Data for Milling

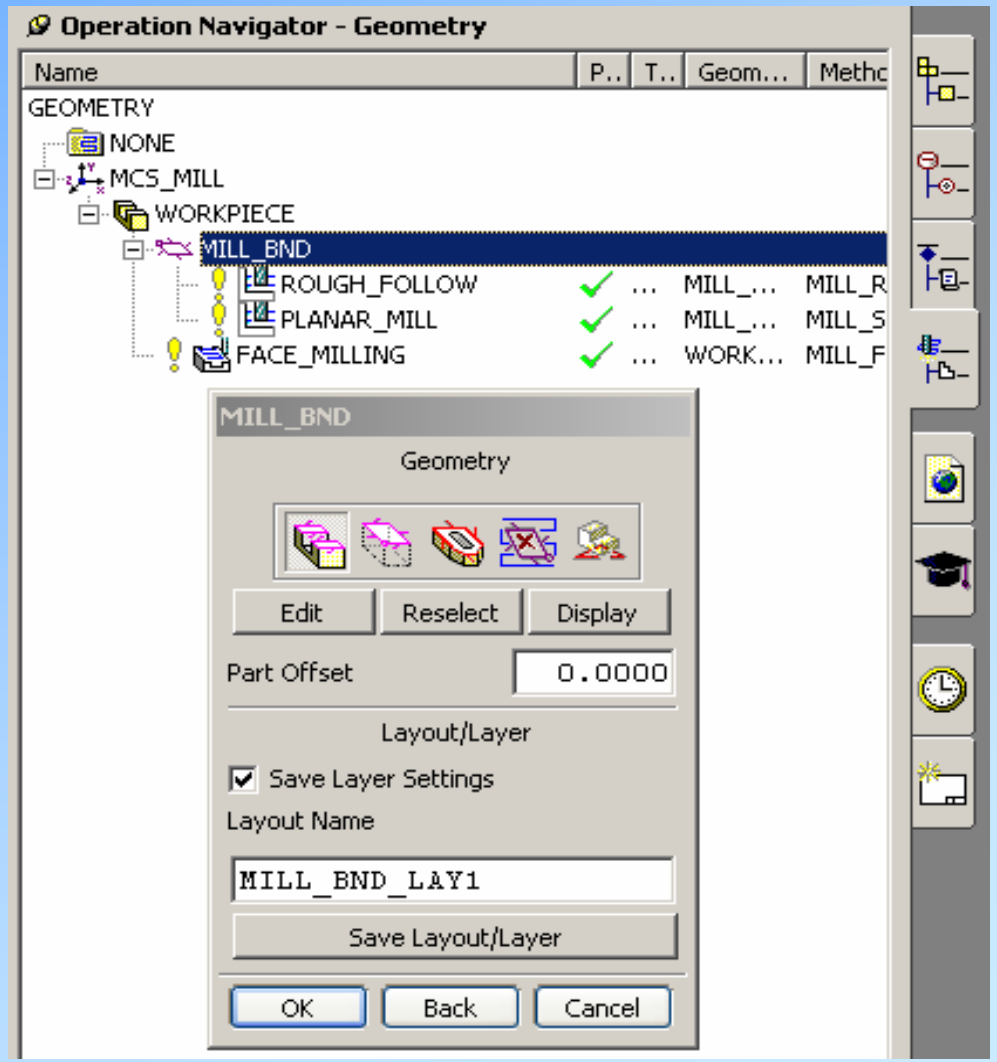
Operation Navigator

MILL_BND

MB1

Double Click



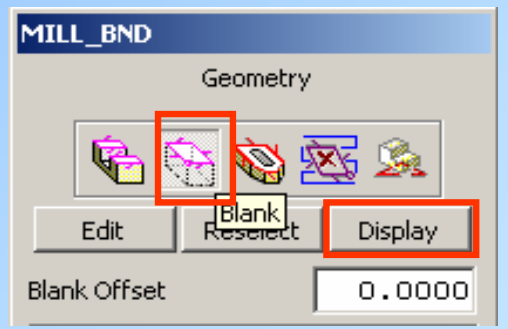


CAM OPERASYONLARI YENİLİKLERİ

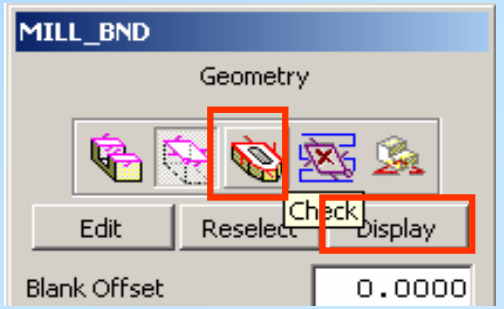
Custom Boundary Data for Milling

Part → **Display**

Blank → **Display**



Check → **Display**



CAM OPERASYONLARI YENİLİKLERİ

Custom Boundary Data for Milling

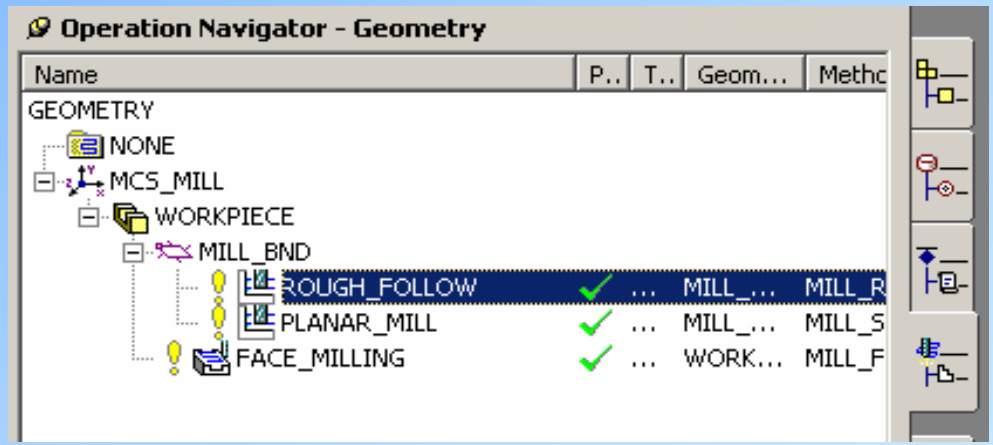
Operation Navigator

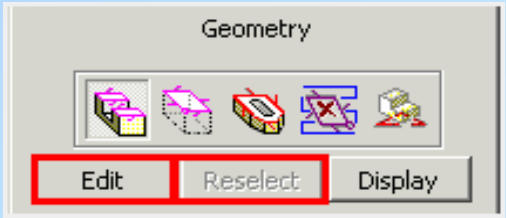
ROUGH_FOLLOW

MB1

Double Click

Part → **Edit**

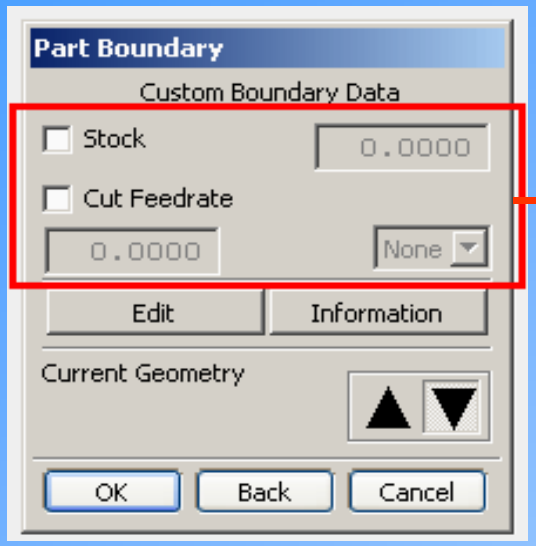




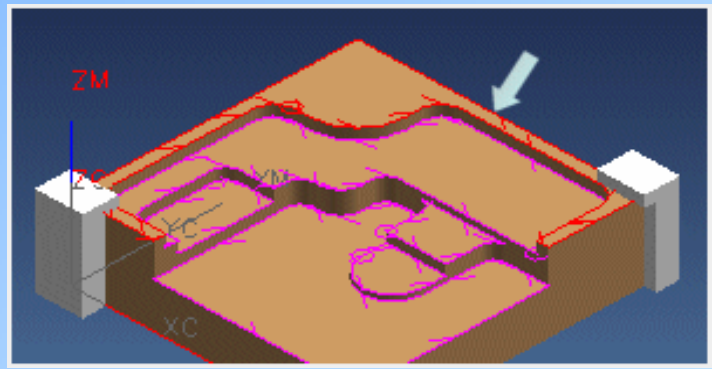
CAM OPERASYONLARI YENİLİKLERİ

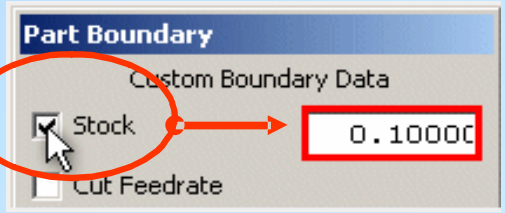
Custom Boundary Data for Milling

Generating



Yeni Özellikler





CAM OPERASYONLARI YENİLİKLERİ

Custom Boundary Data for Milling

Generating

MB3

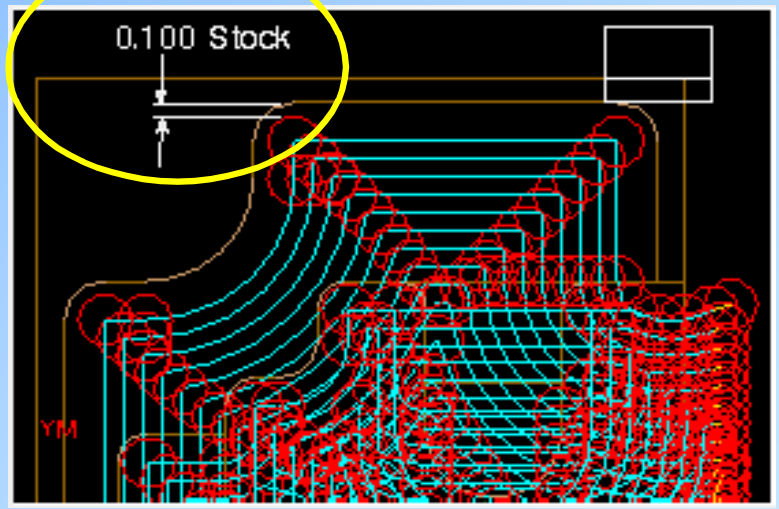
Replace View

Top

Tool Display

2-D

Generate



CAM OPERASYONLARI YENİLİKLERİ

High Speed Milling

Editing

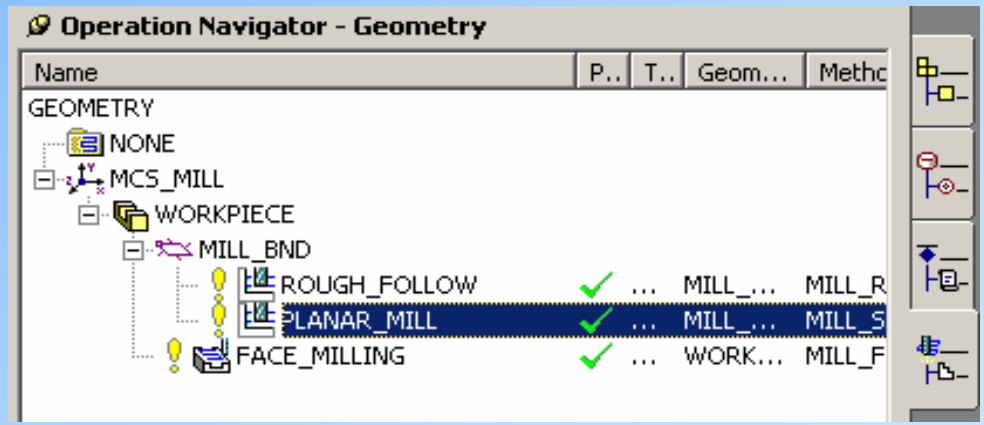
Operation Navigator

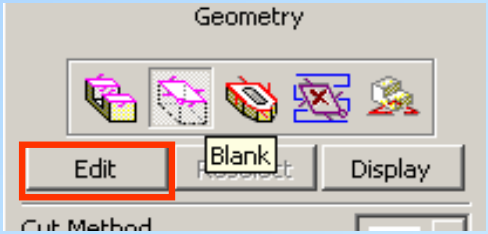
PLANAR_MILL

MB1

Double Click

Blank → **Edit**



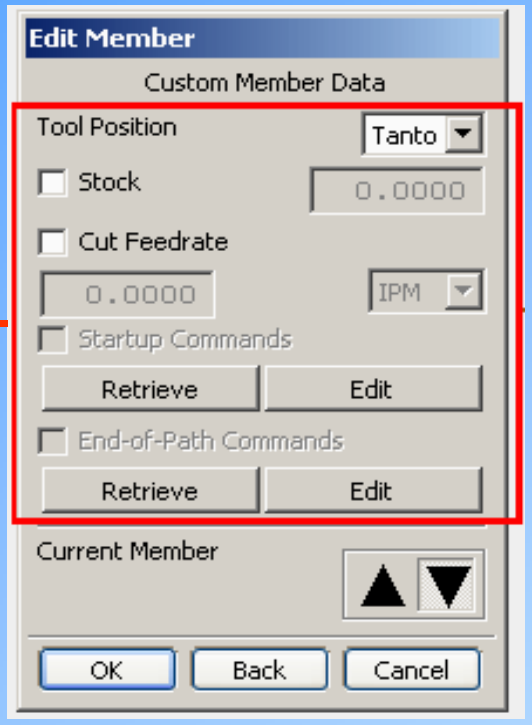


CAM OPERASYONLARI YENİLİKLERİ

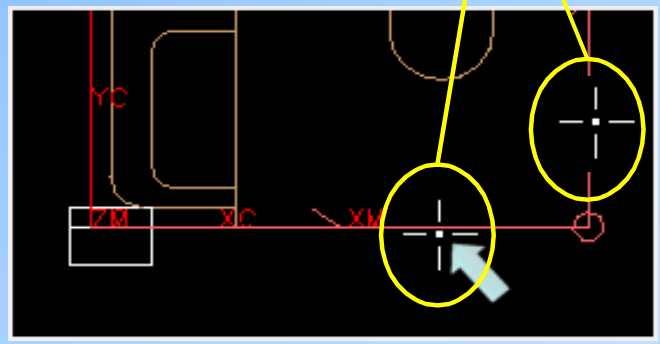
High Speed Milling

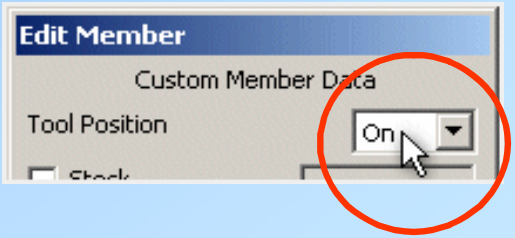
Editing

Yeni Özellikler



Seçilecek Sınırlar

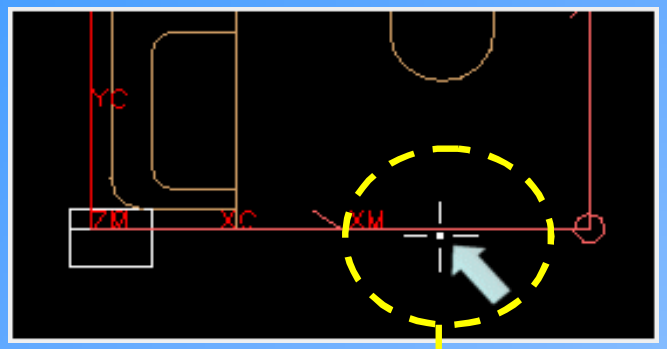




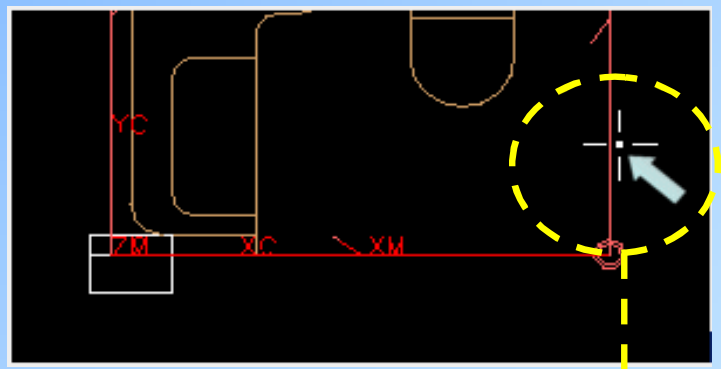
CAM OPERASYONLARI YENİLİKLERİ

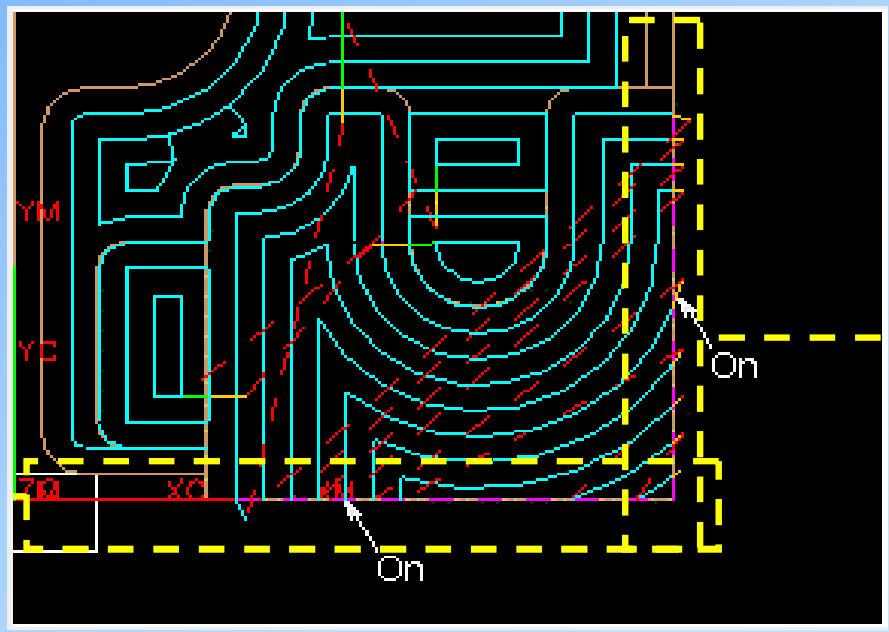
High Speed Milling

Editing



Generate

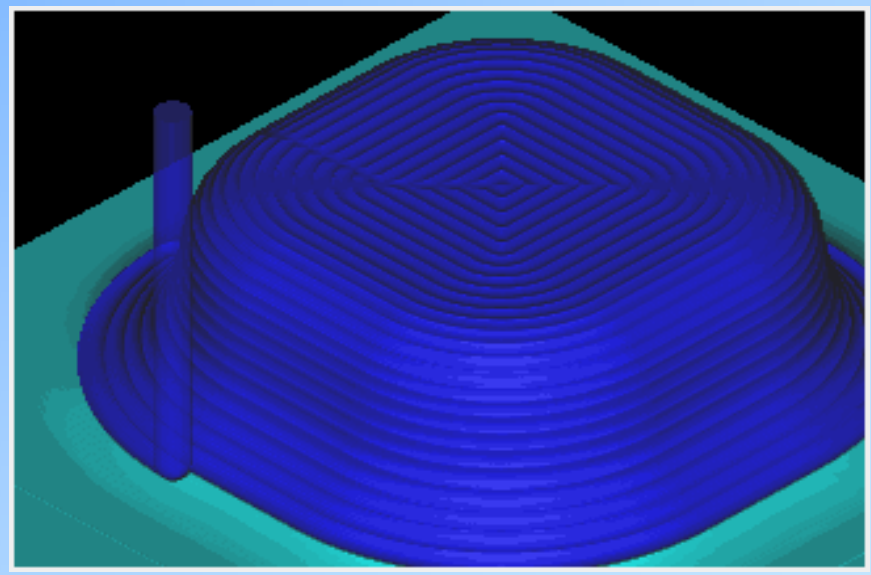




CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Fixed Axis Surface işlemleri içerisinde kullanılan bu özellik ile Steep ve Non-Steep Area işlemlerinde parça üzerinde sabit kesme derinlikleri elde etmek mümkün olmaktadır.



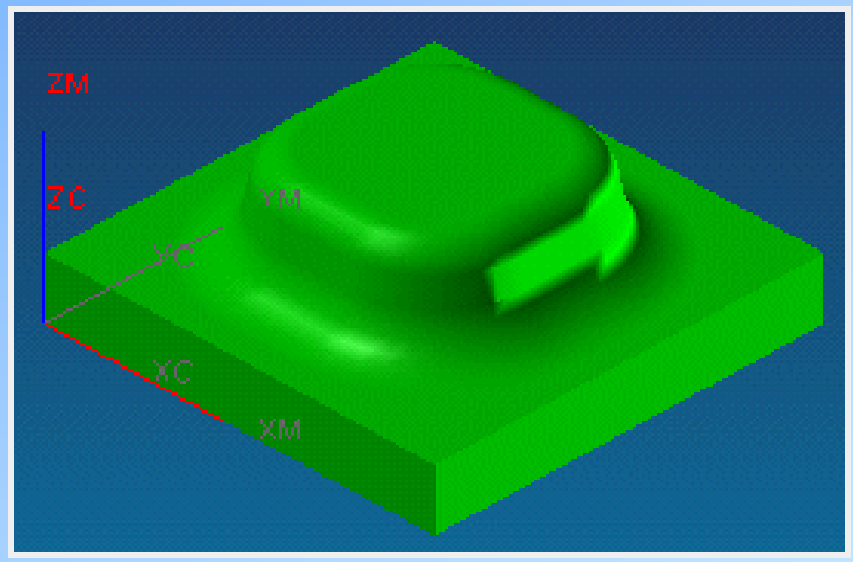
CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

UYGULAMA 7:

Örnek Parça : move2nx_scallop.prt

Application → Manufacturing



CAM OPERASYONLARI YENİLİKLERİ

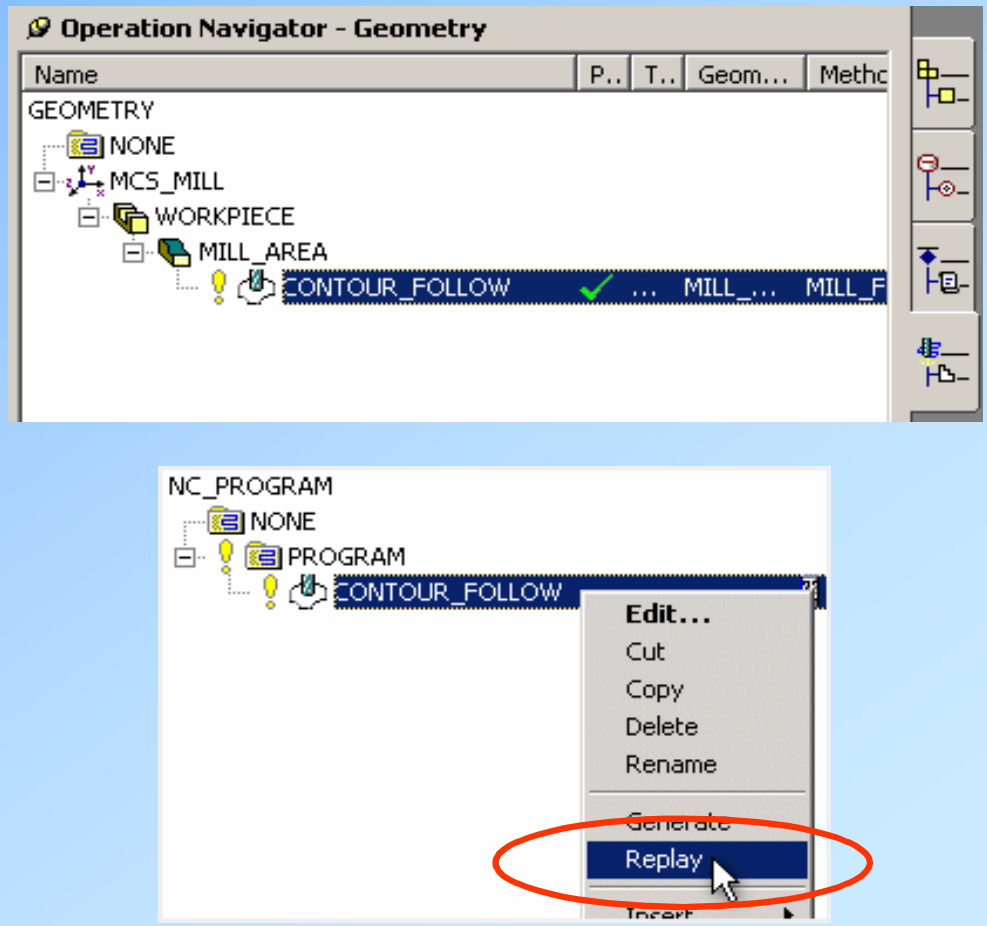
Scallop Height Control in Fixed Axis Milling

Operation Navigator

CONTOUR_FOLLOW

MB3

Replay

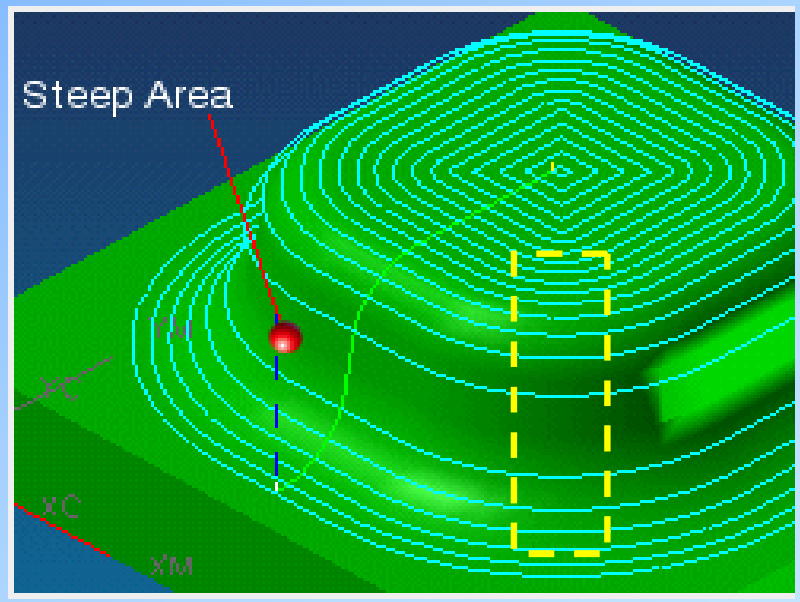


CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Oluşturulan takım yolunun hesaplandığı düzleme göre kesme derinlikleri arasında farklılıklar olabilmektedir.

Yandaki örnekle bu durum ortaya konulmuştur.



CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Visualizing the Scallops

Operation Navigator

↓

CONTOUR_FOLLOW

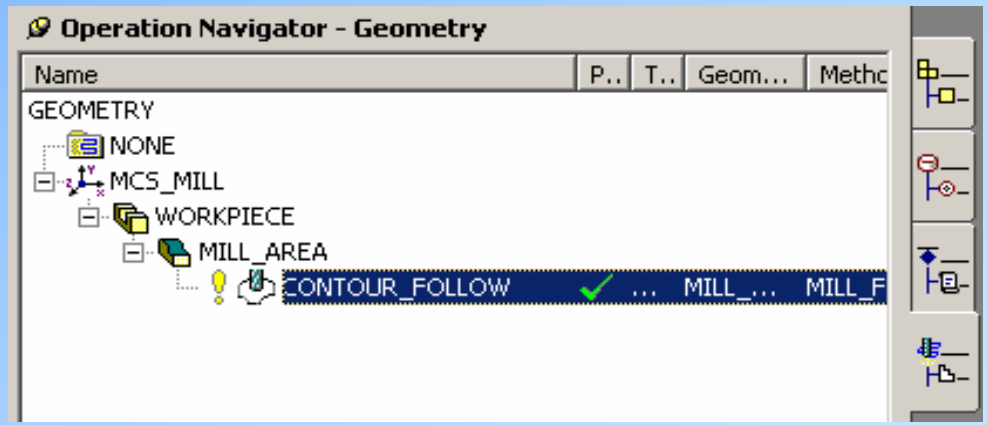
↓

MB1

Double Click

↓

Verify Toolpath



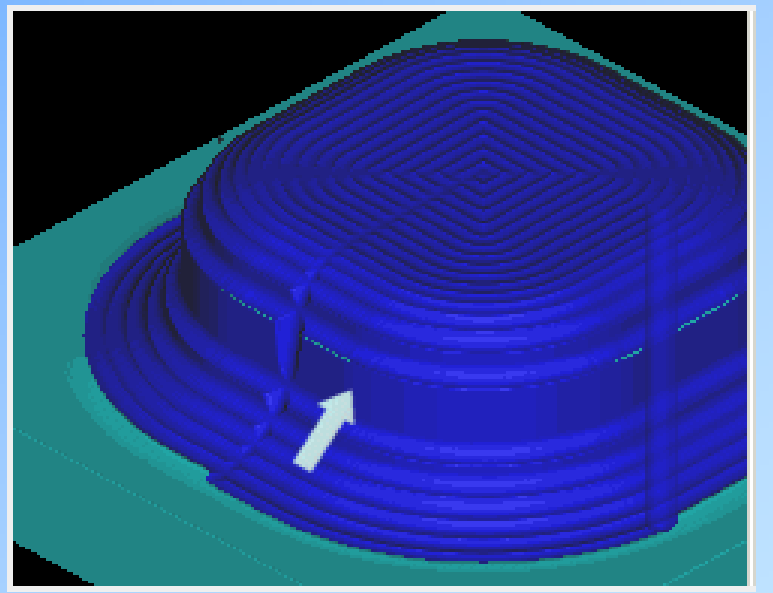
CAM OPERASYONLARI YENİLİKLERİ

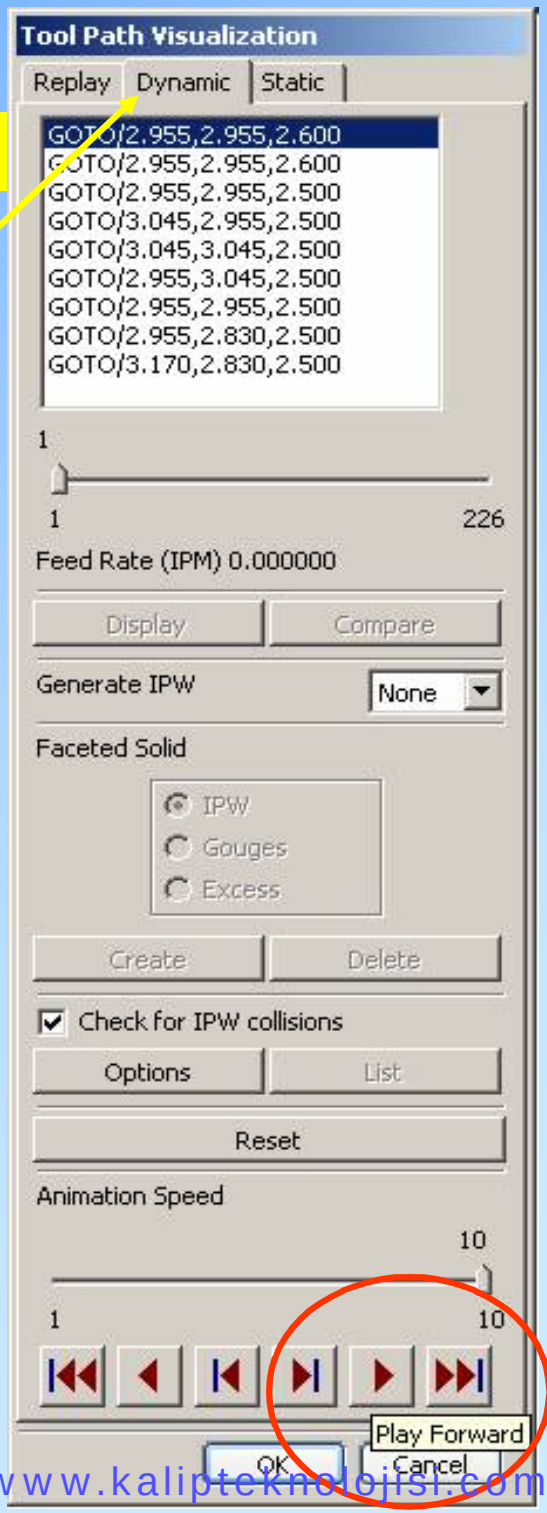
Scallop Height Control in Fixed Axis Milling

Visualizing the Scallops

Dynamic

Play Forward





CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Controlling Scallop Height

Operation Navigator

↓

CONTOUR_FOLLOW

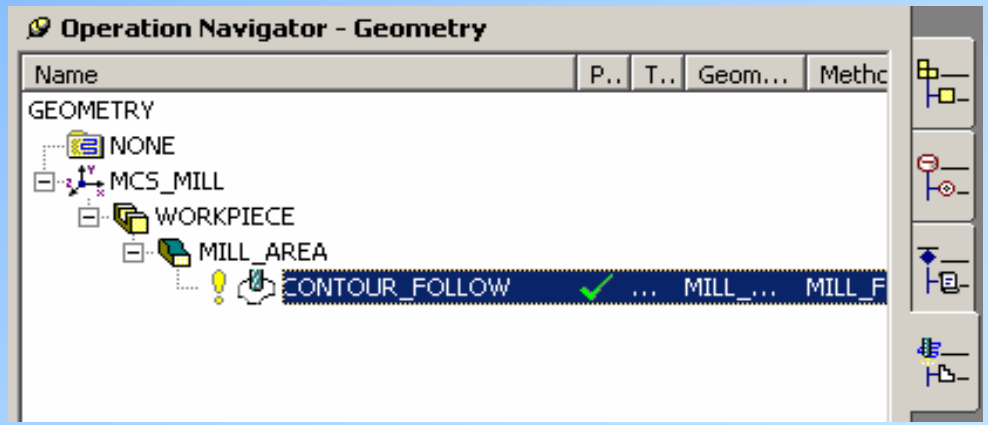
↓

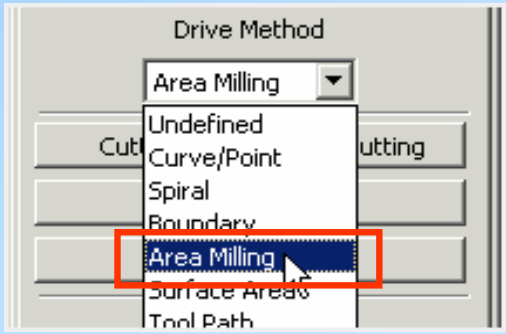
MB1

Double Click

↓

Drive Method → **Area Milling**



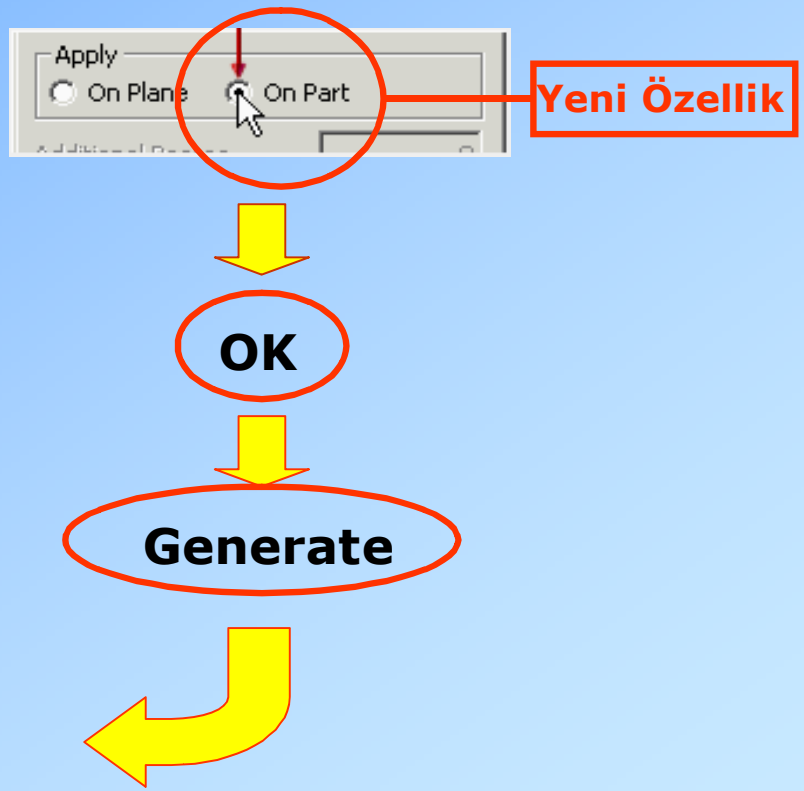


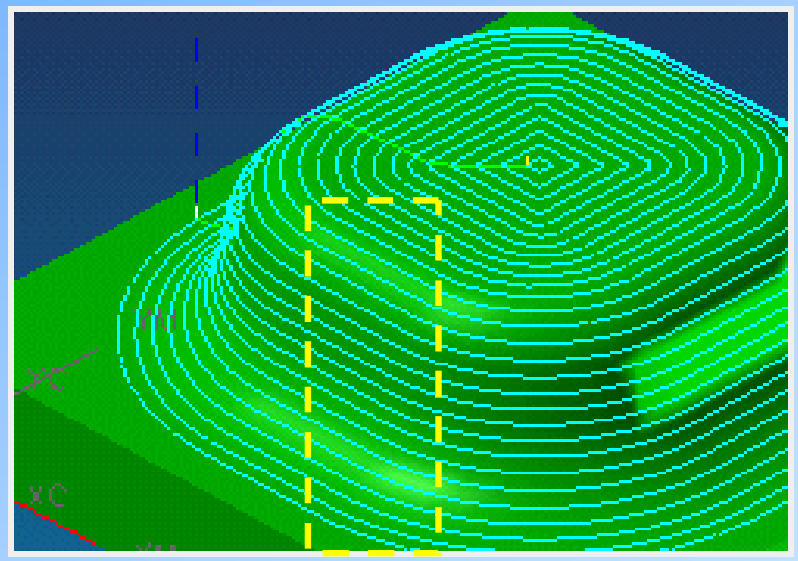
CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Controlling Scallop Height

Hesaplama, düzlem yerine parça üzerine alınmalıdır.





CAM OPERASYONLARI YENİLİKLERİ

Scallop Height Control in Fixed Axis Milling

Controlling Scallop Height