DRD TECHNOLOGY

Choosing Contact Types in Ansys Mechanical

Keagan Clement – Senior Application Engineer

August 8, 2024

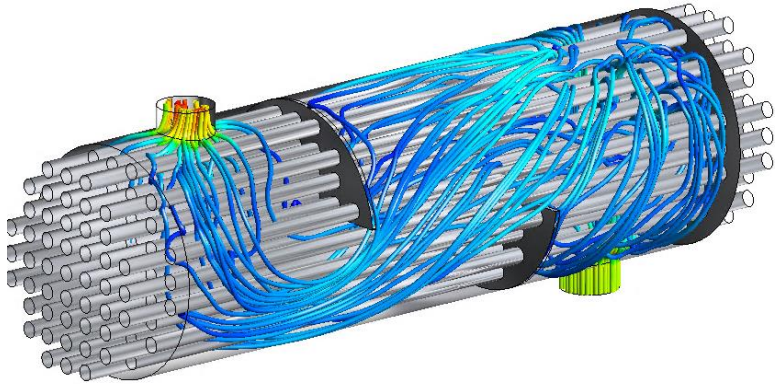
DRD

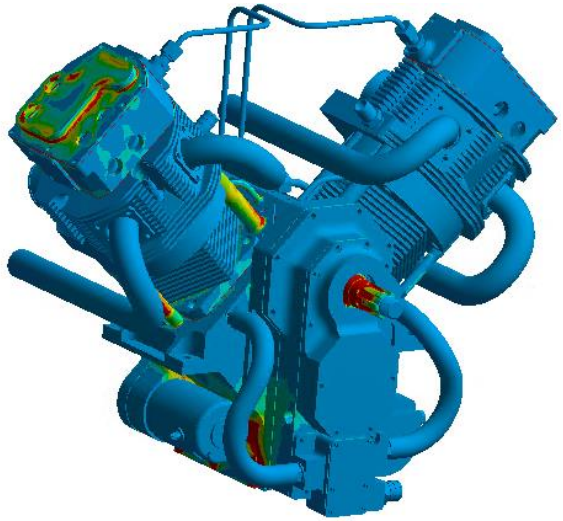
Agenda

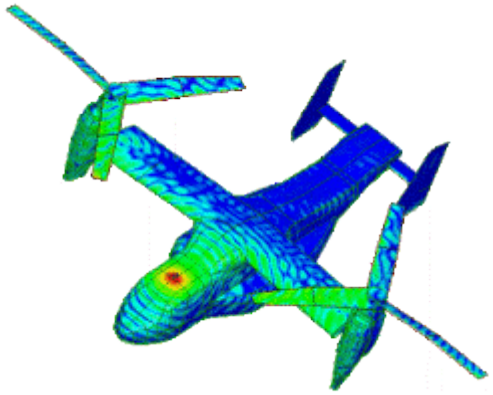
Introduction to DRD
Linear vs. Nonlinear Contact
Summary of Contact Types
Q&A

Mission Statement

DRD Technology helps engineering teams accelerate product development. With in-house expertise spanning the entire range of physics, we ensure customers succeed when using Ansys simulation tools for virtual prototyping and design verification.







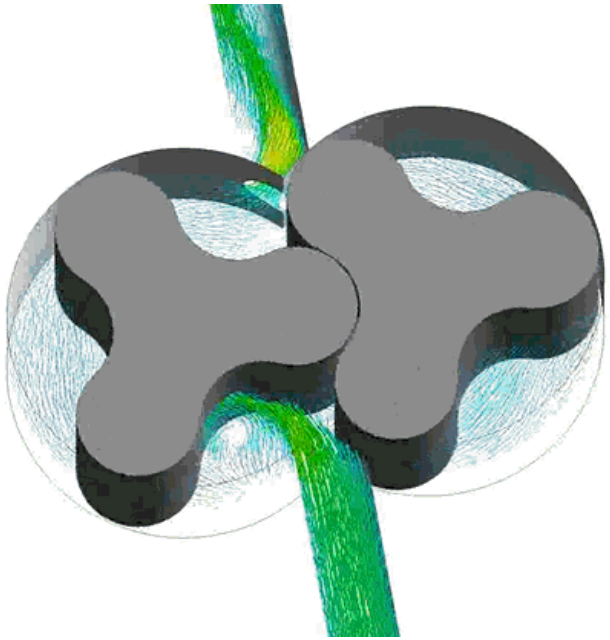
Ansys

CERTIFIED ELITE CHANNEL PARTNER

DRD History

Since 1980, DRD Technology has been focused on engineering simulation.

In 1984, DRD became an Ansys Channel Partner.



Lobe pump

I've been working with DRD for 29 years. Working with your team has been one of the more enjoyable parts of my career. You have always been ready to help in any way.

- Rick Kunc
Sr. Research & Development Engineer

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Ansys
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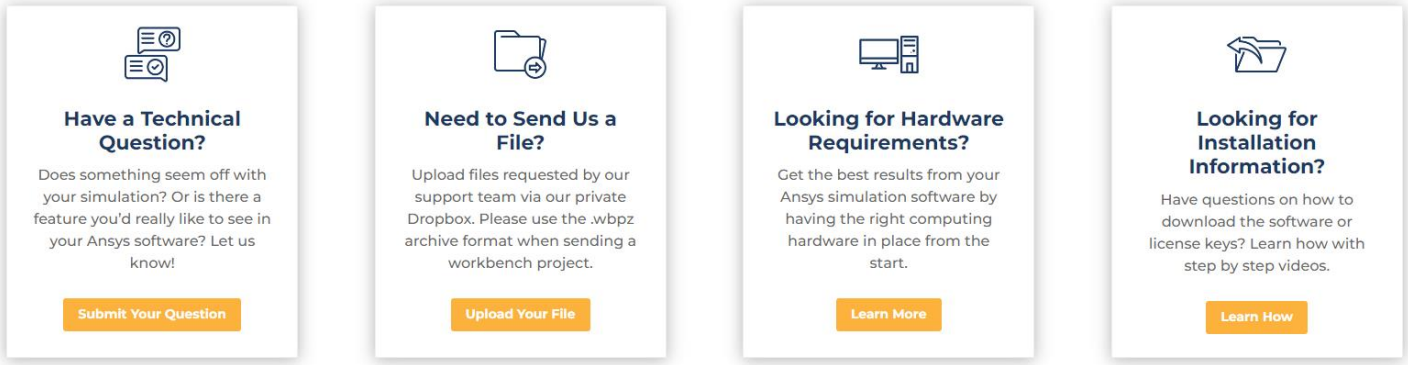
Technical Support Contact Coordinates

Support:
(918) 743-3013 x1
support@drd.com

Or through our website at
www.drd.com



For more than five years, I have worked closely with DRD Technology to execute tactical and strategic initiatives here at EaglePicher due to our unprecedented growth. We've been very happy with DRD and will continue to work with them as our business partner for using Ansys tools effectively and efficiently.

- Doug Austin
Director of Research and Development
EaglePicher™ Technologies, LLC

Ansys Software Training

Courses from DRD

Structures

- Introduction to Ansys Mechanical (2 days)
- Ansys Composite Cure Simulation (1 day)
- Ansys Mechanical Nonlinear Structural Simulation (2 days)
- Ansys Mechanical Structural Dynamics (2 days)
- Ansys Mechanical Fracture Mechanics (1 day)
- Ansys Mechanical Thermal Simulation (1 day)
- Ansys Composite PrepPost (1 day)
- Ansys Topology Optimization and Metal Additive Manufacturing (1 day)
- Ansys Workbench LS-DYNA (2 days)
- Advanced Meshing for Ansys Mechanical (1 day)
- Introduction to SpaceClaim for Ansys Mechanical (1 day)
- Ansys Mechanical Fatigue Life Prediction (1/2 day)
- Ansys nCode Design Life (2 days)

System Modeling

- Introduction to Ansys Twin Builder for Mechanical Systems (1 day)

Fluids

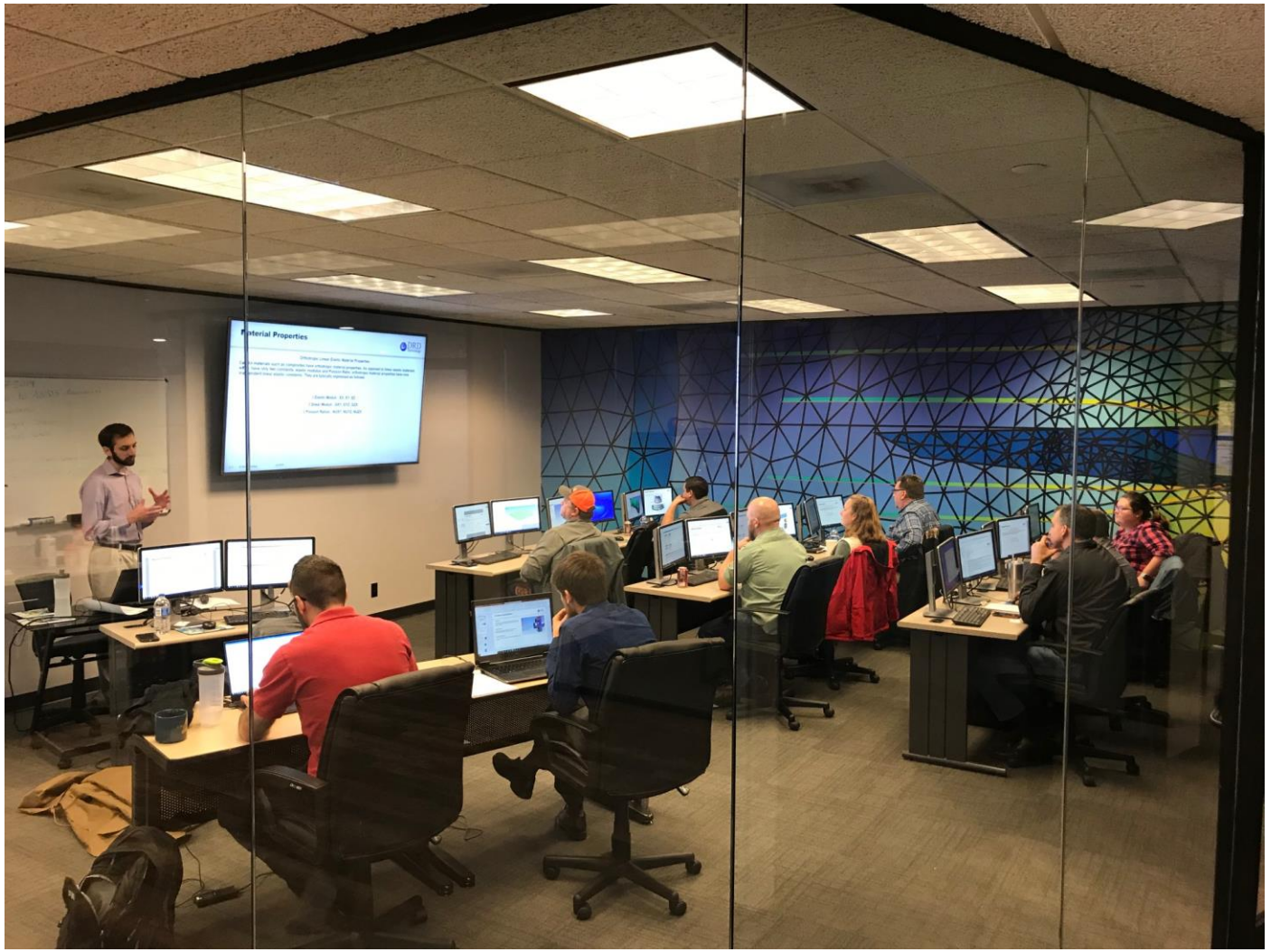
- Introduction to Ansys CFX (2 days)
- Introduction to Ansys Fluent (2 days)
- Workbench Meshing for Ansys Fluent (1 day)
- Fault Tolerant Meshing for Underhood Thermal Modeling with Ansys CFD (1 day)
- Ansys Rocky (1 day)

Electronics

- Introduction to Ansys HFSS (2 days)
- Ansys HFSS Antenna Design (2 days)
- Ansys HFSS SBR+ Antenna Placement Design (1 day)
- Introduction to Ansys Slwave (1 day)
- Introduction to Ansys HFSS 3D Layout (2 days)
- Introduction to Ansys Maxwell (1 day)
- Ansys Maxwell Motor Modeling (1 day)
- Introduction to Ansys Icepak (2 days)

DRD Tulsa, OK Training Facility

In person training may be conducted at DRD's Tulsa offices or on-site at a customer's facility.



DRD's training has the right mix of theoretical background, technical depth, and practical application.

- *Patrick Stahl*
Sr. Product Development Engineer
Bobcat

Ansys Expert Mail List

Request to be added by sending a note to support@drd.com

Ansys Expert Tech Corner

We hope that our website provides a great deal of valuable technical information, which is available to anyone who visits our website. The technical materials on this page, however, are intended only for DRD's customers, and are, therefore, password protected. We provide these materials to our customers as a benefit for doing business with DRD, and at our discretion we provide them to selected DRD friends and associates.

The topics on this page are intended for engineers who are interested in highly technical and detailed information on Ansys. These topics contain information, which is not readily available to Ansys users through standard documentation and training courses. For example, some topics provide information on Ansys capabilities that are under development or are not documented.

Previous Expert Topics

- 2022
- 2021
- 2020
- 2019
- 2018
- 2017
- 2016
- 2014 - 2015
- 2003 - 2013

Fracture Mechanics Webinar: Gain Insight Into Structures with Cracks with Ansys Fracture Mechanics - (April 2023)

This webinar, conducted on April 28, 2023, provides a brief overview of fracture mechanics and Ansys capabilities in fracture analysis. DRD discusses safe-life vs. damage tolerant design, material data acquisition, and simulation of cracks in structures. Ansys fracture capabilities include both stationary, and static and fatigue crack growth options for engineers to analyze their systems.

For a recording and the presentation slides, download here. (A password is required if you have not obtained one already. Select Fracture Mechanics Webinar (April 2023) from the password topic list).

Linear versus Nonlinear Contact

Linear Contact

- No change in contact status
- Easier and faster to solve
- Types: Bonded or No Separation

Nonlinear Contact

- Contact status can change
- Requires solver iteration
- Types: Frictionless, Frictional, or Rough

Bonded Contact Type

- Linear Contact
- Bonds surfaces together
- Initial gap or penetration ignored
- Suitable for welds, bolted connections, etc.
- Assumption: two parts act as a single part

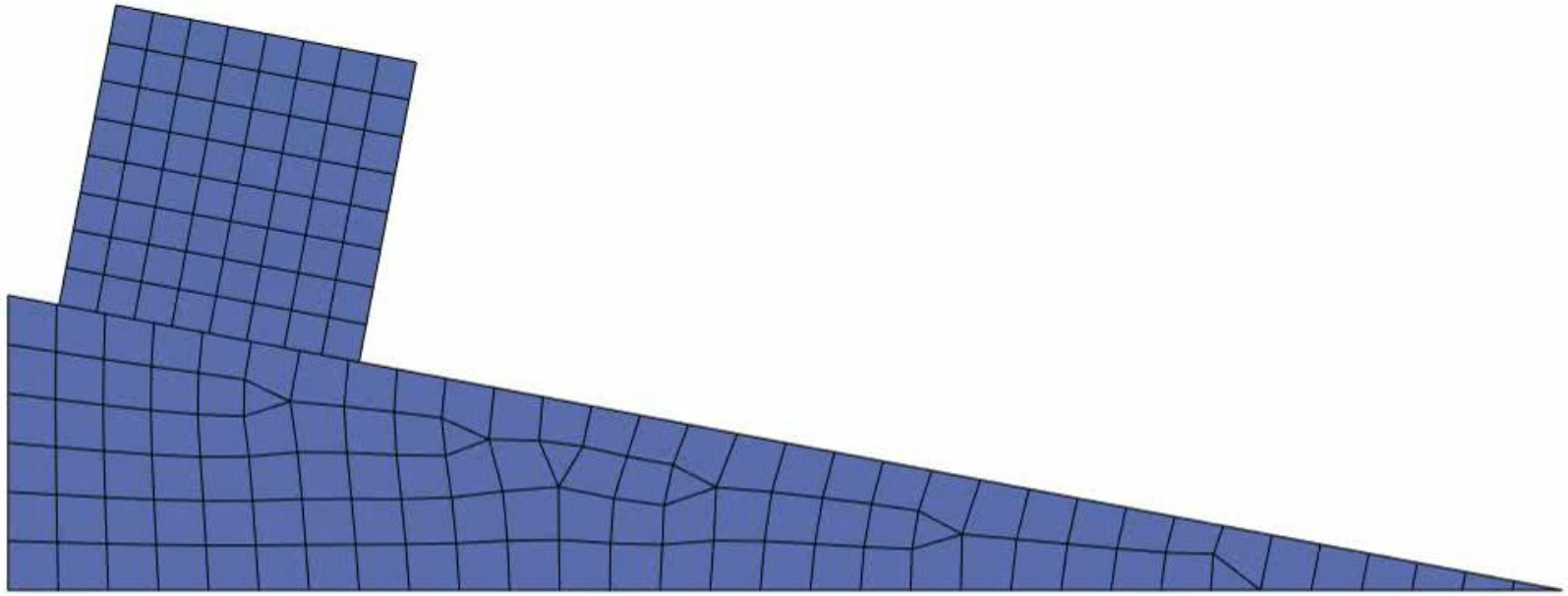
No Separation Contact Type

- Linear contact type
- Initial gap or penetration ignored
- In-plane sliding allowed
- Suitable for surfaces that are in contact but not bonded
- Assumptions: surfaces will not separate, friction can be ignored

Frictionless Contact Type

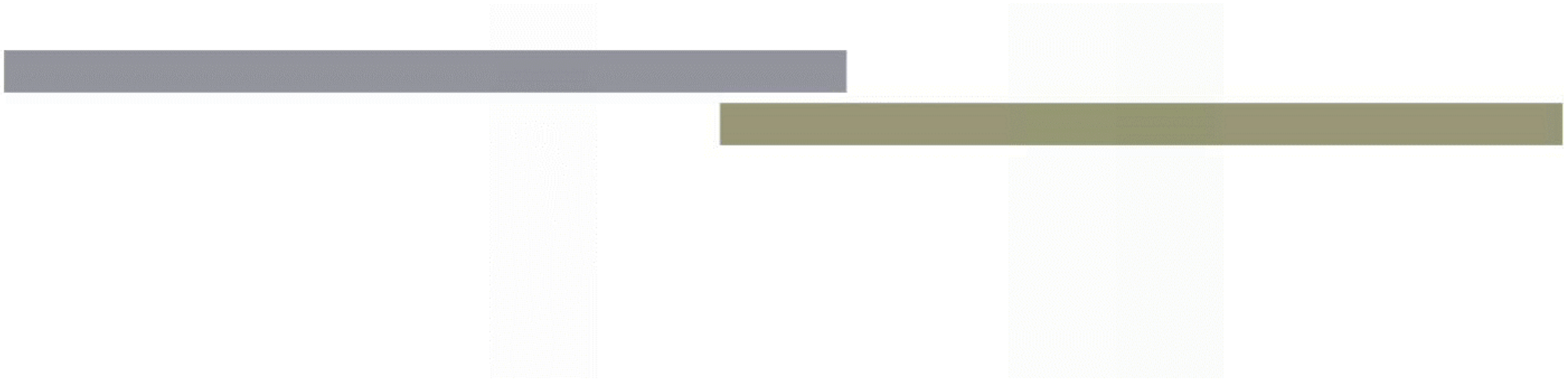
- Nonlinear contact type
- Respects geometric gap or penetration
- Separation and collision both allowed
- Applies to many situations where surfaces may touch but are not joined
- Assumptions: friction is ignored

Frictionless Contact Type

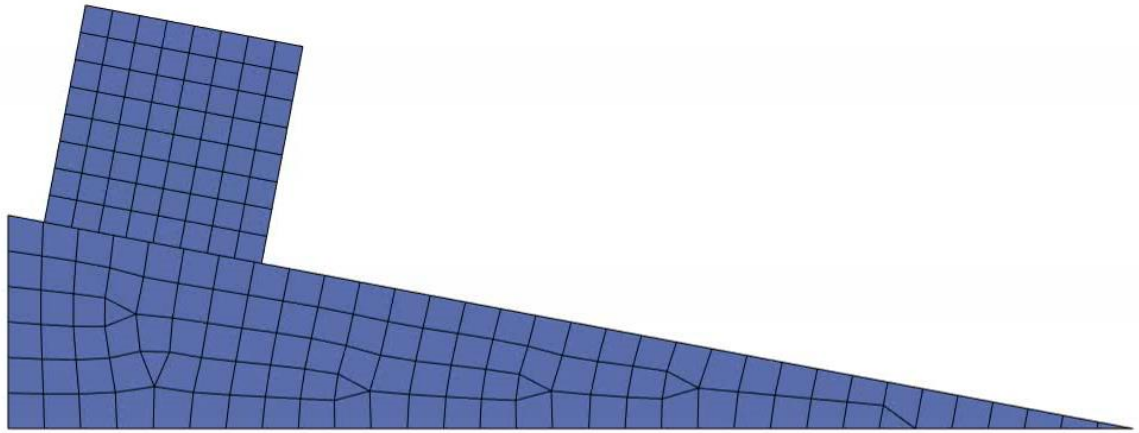


Frictional Contact Type

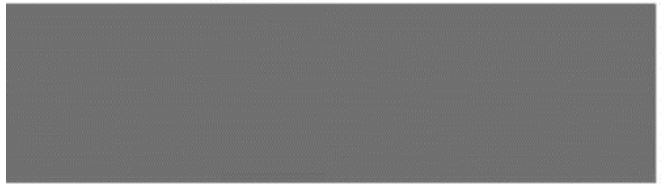
- Nonlinear contact type
- Most behaviors shared with Frictionless
- Respects geometric gap or penetration
- Separation and collision both allowed
- Applies to many situations where surfaces may touch but are not joined
- Friction controlled by a user-specified friction coefficient



Frictional Contact Type

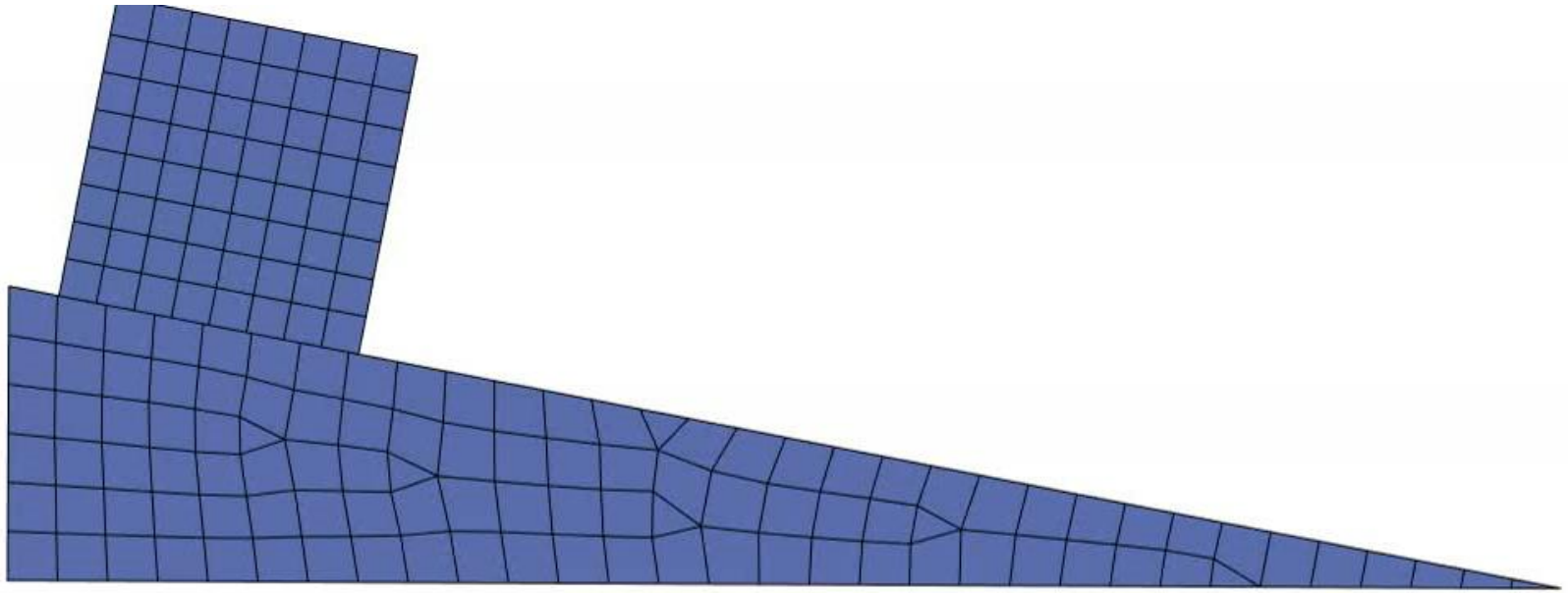


Rough Contact Type



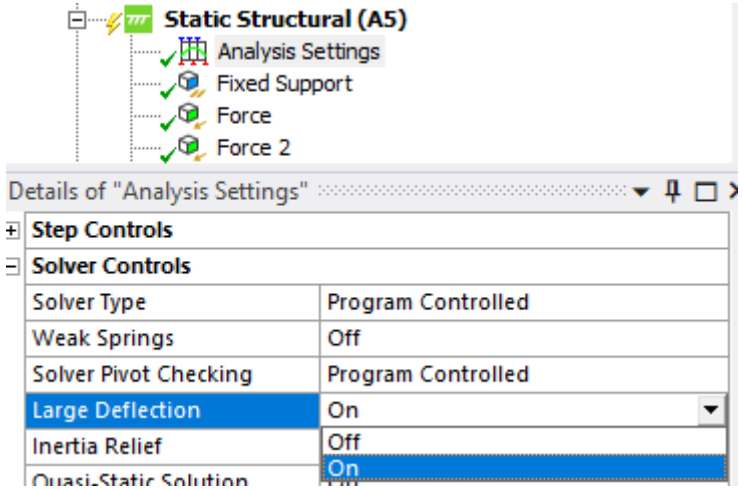
- Nonlinear contact type
- Most behaviors shared with Frictionless and Frictional
- Respects geometric gap or penetration
- Separation and collision both allowed
- Applies to situations where surfaces in contact have very high friction
- Assumption: no sliding allowed

Rough Contact Type



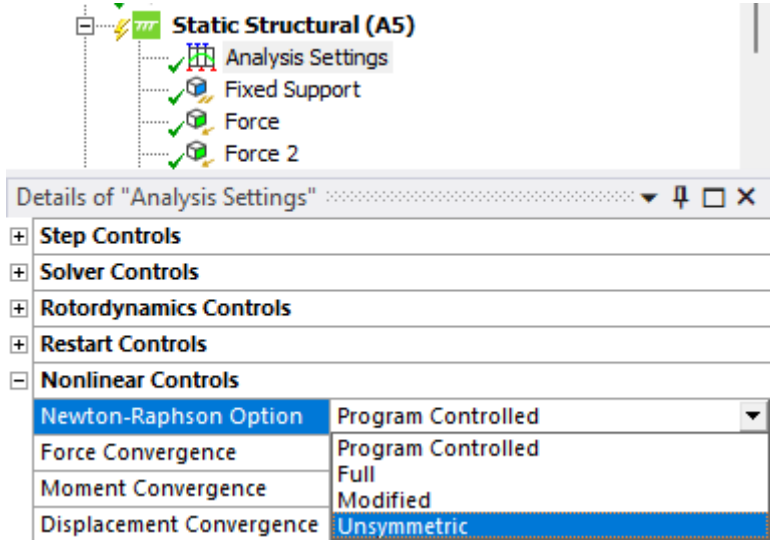
Large Deflection Setting

- Turn Large Deflection on for models with nonlinear contacts



Newton-Raphson Option

- Models with friction: Unsymmetric setting for Newton-Raphson Option
- Easier convergence but slower iteration
- Recommended if displacements affected by friction
- Rule of thumb: Unsymmetric method if friction coefficients > 0.2



Questions?