

## Chapter 5 Introduction Transcript

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Hello. In this chapter, we are going to talk about engineering structures. An engineering structure is any set of bodies connected together to form a larger whole. This could be something mostly stationary, like all the pieces of a building working together to form the building, or something with more complex interactions, such as the components of a bolt cutter working together to perform a task.

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Engineering structures are generally divided into two categories for analysis. The first category is trusses, which we analyze one way. The second category is frames and machines, which we analyze differently. The key feature that separates trusses from frames and machines is the concept of two-force members. Trusses are made entirely of two-force members, while frames and machines include members that are not two-force members. This distinction is important because the assumption of two-force members is essential to how we analyze trusses.

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For trusses, we have two methods of analysis. The first is the method of joints. As the name suggests, this method examines the joints where members connect. It relies on equilibrium analysis for concurrent force systems. Because truss members are two-force members, the forces at each joint form a concurrent force system.

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The second method is the method of sections. This method involves cutting the truss into sections and analyzing each section using equilibrium analysis for extended bodies. Depending on the situation, one method may be faster or more convenient than the other.

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For frames and machines, we use a single analysis method, which we call the analysis of frames and machines. This method is also based on equilibrium for extended body systems. In this approach, we examine each piece of the frame or machine as an extended body. A key part of this

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analysis is applying Newton's Third Law to understand how forces interact between connected components.

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That is what we will cover in the structures chapter of the textbook. Thank you for listening.