Summary

Our team has examined the structural integrity of the World Trade Center Buildings. We have conducted research on the building structural models and focused on the metals that were used to support the main structure. We used the computer model to predict at which the point of the World Trade Centers would not have collapsed. We researched all the contributing factors involved.

Statement Of Problem

What structural weakness in the World Trade Center caused it to collapsed?

Description of Method

The method we used in creating the model is to use the actual measurements and draw it on the computer that shows all the measurements and weight of the towers. The two models are the same and were both calculated the same.

Result of Study

North tower was hit at 8:45 am. The south tower was hit at 9:30 am. Through research we have found out that the south tower collapsed twenty-three minutes earlier than the north tower. The correct time of the collisions were: the first tower 10:28 am, 1 ¾ hrs. after impact. Second tower collapsed at 10:05 am.

A significant part of the research has determining behavior of steel framed buildings under extreme events such as severe earthquake or severs fire damage. The effect of the impacts can only be assessed in light of these details, in particular the devastatingly high local impact force on the buildings from the planes.

Conclusion:

We concluded that the towers collapse because of heat temperature, steel trusses and weight. Eventually, the loss of strength and stiffness of the materials resulting from the fire, combined with the initial impact damage, would have caused a failure of the truss system supporting a floor, or the remaining perimeter columns, or even the internal core, or some combination. Failure of the flooring system would have subsequently allowed the perimeter columns to buckle outwards. Regardless of which of these possibilities actually occurred, it would have resulted in the complete collapse of at least one complete storey at the level of impact.

References

1. http://www.civil.usyd.edu.au/wtc.htm
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World Trade Center Collapsed

AiS Challenge
Final Report
April 3, 2002
Team 103
To'hajiilee

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Achievements:

We had no significant original achievements on this project.

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