



## **MMAE SEMINAR**

**Wednesday, September 13, 2006**  
**E-1 BUILDING – CRAWFORD AUDITORIUM**  
**3:30 – 4:30 PM**

### *Optimizing the Use of Ultra High Strength Steels*

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#### **Abstract**

Ultra-High Strength Steel (UHSS) sheet has been available in coil form for about 30 years. The properties are developed by heating, quenching and tempering steel strip in a continuous furnace. Strength and ductility combinations are determined by the initial carbon content (0.08 to 0.25 wt%), the relative fraction of Martensite vs Ferrite, and the degree of tempering. These steels are suitable for high volume component manufacture through rollforming, bending and simple stamping operations. Some of the most important applications are in the automotive industry, especially to meet various safety standards with minimal mass. (Energy consumption is reduced both in the manufacture of the steel and in the vehicle's fuel efficiency.)

For some components made of relatively thin sheet, loss of load carrying capacity may be caused by a distortion of the original cross-section, e.g. buckling. Therefore, designing the most mass efficient component means designing a cross-section that is maintained to the highest practical loads. Design guidelines are given for two regimes of geometry. In one example, better design resulted in a 37% mass reduction with no change in the thickness of the main component.