**Development of a Deflector on the Top Edge of the Front End of a Bluff-Nose Train for
Reducing the Compression Wave Generated by the Train Entering a Tunnel**

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A deflector attached to the top edge of the front end of a bluff-nose train has been developed for reducing peak values of compression wave $\Delta p$ and its pressure gradient $(dp/dt)_{max}$ generated by the train entering a tunnel.  Firstly, the approximate geometry of deflectors and their possibilities of reduction of $\Delta p$ and $(dp/dt)_{max}$ were investigated by model shooting experiment.  Secondly, the precise geometry of deflectors for actual trains was determined by wind tunnel experiment.  Finally, we examined the effects of the deflector on reduction of $\Delta p$ and $(dp/dt)_{max}$ and prevention of flow separation on the top side of the front end of the train through flow visualization using tufts by running tests with an actual train.  It has been demonstrated that the deflectors attached to the top edge of the front end of the actual train can reduce the peak values of $(dp/dt)_{max}$ by 26 percent.