



- The International Maglev Board Steering Committee Opinion –

Lessons from the High Speed Train Disaster in Zhejiang, China, 2011

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An increasing number of technical and economic problems have arisen recently with steel-wheel high-speed trains. This situation makes it appear that the safety of steel-wheel high-speed trains can often only be partially guaranteed, seemingly putting the lives and well-being of passengers and train staff alike at risk.

Not an individual case?

The 1998 accident involving a high-speed train in the German town of Eschede, with over 100 casualties, is seen today as the result of neglected maintenance and material defects. This is also true for the derailment of a high-speed train (fortunately, not serious) following a broken axle in Cologne in 2008, also apparently caused by insufficient maintenance and material fatigue. The most recent dramatic example for the extreme risk of high-speed travel based on steel-wheel technology occurred on 23 July 2011 in the East Chinese province of Zhejiang. In this accident, a high-speed train of the CRH2 series type collided on a viaduct with a train of the CRH1 series type. Worldwide media reported extensively on this accident.

The control cab coach and three railway carriages plunged from the 20-meter-high viaduct, one remaining propped up against the viaduct, killing at least 37 people. Another 200 persons were hurt, many of them seriously. Confronted with an obvious lack of safety measures on both the trains and their infrastructure, Chinese authorities then displayed dreadful crisis management – at least from a scientific point of view. Instead of beginning to search painstakingly for the causes of the accident, the derailed carriages of the ruined trains were broken apart by excavators and the carriage parts were promptly buried on site. Following massive protest by the victims, relatives and the general public, the scattered train parts were dug up the following day in order to examine them again, according to official information.

The Chinese train accident - from the perspective of the International Maglev Board

Since 1997, the International Maglev Board (IMB) has continually pointed out — at conferences, in the Newsletter, with editorial statements and press releases — the difficulties that still exist in controlling the dangers inherent in a system based on steel-wheel technology. The IMB has repeatedly warned about the risks for passengers and train staff. In view of the tragic developments that have only confirmed their worst fears, the IMB is mainly concerned with the suffering of the victims and their families. It is sad when warnings prove to have been tragically correct after all. However, in a worldwide high-speed train market focused on steel-wheel technology, IMB's reminders about such risks will remain unwelcome into the foreseeable future.

In the meantime, with what appears to be a very rash decision in favor of steel-wheel technology for high-speed travel, China has started on a path that could lead to more accidents such as the one in Zhejiang. At the same time, it is actually beyond dispute that magnetically levitated ground transportation systems such as Germany's Transrapid and Japan's Superconducting Maglev feature technological systemic advantages that would rule out a collision between two different trains due to their Fail-Safe-Principle.

This also applies specifically when there is a breakdown in important components in the control engineering, including in the positioning systems. The advantages of the system technology of Maglev regarding safety, comfort and speed are very clear from a scientific point of view.

Causes and Responsibility

Grief over what has happened should, however, not lead to a standstill in engagement. For example, we at the IMB feel it is time to think about responsibility for this current focus on steel-wheel development. The fact that the long-distance route Beijing-Shanghai was provided with not particularly suitable, conventional steel-wheel technology —instead of Maglev technology that had been planned for a long time and would have had advantages in safety and comfort as well as in providing shorter travel times— leads not just a few experts to look at the relevant self-interested parties (including western companies) who want to perpetuate a steel-wheel technology that is prone to wear and tear, thereby ensuring themselves decades of maintenance contracts, i.e. securing monopoly-like sales figures and profits.

Particularly in the West, industry has never had any genuine interest in establishing an economically optimal traffic system in the high-speed travel sector in China – rather, it seems that the endeavor has been dominated primarily by the attempt to realize more financially lucrative technology: high-wear, steel-wheel technology.

The responsibility for this obviously negative development does not, by any means, lie with Chinese decision-makers: a large part of the high-speed tracks of relevant Chinese projects was originally copied directly from large Western companies, or is from the training that engineers had in western technology. The guidelines and setting of priorities for this training sprang from the pens of Western railroad engineers and managers.

Japan is modernizing their high-speed train system by building a new 500-km/h Maglev train route that will replace today's Tokaido-Shinkansen (a steel-wheel system) in very high-speed traffic. Investment and financing approaches have been decided upon and realization of the project has begun. The magnetically levitated high-speed train is seen as the new infrastructure backbone of the Japanese economy: safe, super-fast, little wear-and-tear and economical.

And elsewhere?

In Great Britain, the USA, India and South America (Brazil) western companies are still trying to push what the IMB feels is a not-very-suitable steel-wheel technology onto the market without regard for the better option: maglev.

The economic cost of a high-speed train system based on outdated steel-wheel technology is not paid for by the system providers. Rather, the ones to suffer are the operators with horrendous maintenance costs and safety concerns, customers with unattractive ticket prices, the economy with an overall inefficient transportation infrastructure and, most obviously, accident victims with their very lives and health at stake.

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