Report from Bonn by Rainer Apel

Accelerate the start of the maglev era

The high-speed train disaster at Eschede puts a spotlight on the flaws of outdated rail technologies.

It happened shortly before 11 a.m. on June 3: A German high-speed train of the ICE (Inter-City Express) class, going at 200 kilometers per hour, was derailed at the town of Eschede. Some cars hit the pillars of a bridge and caused it to collapse; the last five cars ran into the debris of the bridge, and were compressed into one another. Ninety passengers died at the scene, and five more died later. More than 100 people were injured, many of them seriously. ICE 884, coming from Munich, had crashed less than 30 minutes away from Hamburg, the final destination of its six-hour trip.

How could it happen? The ICE, since it was introduced in the spring of 1991, had never had any serious accident, and was considered the safest train of all. Since 1991, the ICE had carried more than 100 million passengers; it had developed into the flagship of Germany's modern rail fleet, accounting for 30% of the annual turnover of Deutsche Bahn, the state-owned railway company. And, another question: If it happened once, could it happen again?

As for the causes of the crash, a thorough investigation turned up part of a steel wheel, apparently belonging to one of the wrecked cars. It was found nearly six kilometers away from the crash site, where the tracks and concrete ties also showed signs of damage.

The investigative teams also identified a switch, 300 meters away from the damaged bridge, as the final cause of the derailment: The damaged wheel must have gotten stuck in the switch and pushed the car off the track. It must have been the first car, as the outer casing of a wheel on that car had been cut through, so that the wheel would not stay on track.

The locomotive suffered almost no damage, and the train engineer suffered no injuries himself, except a severe state of shock. He had not been able to notice the damaged wheel: The ICE has a sophisticated electronic sensing system to detect all kinds of malfunctions—but none for the wheels.

Learning about this safety gap through the media, the German public has been very angry at the railway authorities. It also turns out that one year after its introduction, the ICE was equipped with new wheels, as the old, solid ones were considered "too noisy." The new wheels consisted of the basic wheel with an extra, outer casing, which rested on a hard, rubber ring, separating it from the wheel proper. This reduced the travel noise significantly, and made riding an ICE train more comfortable.

But the money to install an electronic sensing system to reveal fissures in the steel or rubber parts of the wheels, was not spent, probably for budget reasons. And, in 1992, when the new wheels were mounted, Deutsche Bahn also closed down a maintenance center in Hamburg, which was equipped with ultrasound devices that had provided a modern way of checking train parts for material fatigue. Strangely enough, a new maintenance center, operating in Munich, used only primitive manual and visual checks, with workers knocking on the wheels, using a simple flashlight to spot cracks or other signs of material fatigue on the wheels.

This primitive method worked until the morning of June 3: The last safety checks were carried out on ICE 884, which left Munich Central at 5:35 a.m.

The national outcry about these flaws in the safety system compelled the railway management to decree immediate ultrasound checks of all ICE trains that have these 1992 wheels. And, a broad debate has begun about whether budget cuts can still be allowed, after this tragedy at Eschede.

It is a necessary, long overdue debate, but unfortunately, it is a debate about an old technology. Modern as these ICE trains look, their basic technology is the same rail-wheel system that was used at the beginning of the railway era, 150 years ago. The introduction of magnetically levitated (maglev) trains, a technological jump into a new era, has been overdue for 20 years.

The Transrapid maglev train, the bottom of which "embraces" the track so that both parts form the engine, cannot derail. Any malfunction of this integrated system will immediately bring a Transrapid train to a halt, but it would stay on track. Eschede-type crashes could never occur with a maglev train.

Looking back at the 1980s, when the administrative decisions were made to build new trains for the 1990s, it was a big mistake not to introduce the maglev technology, which already existed at that time. Instead, the government and the railway managers opted for the ICE trains, as the allegedly "cheaper" solution, because maglev trains would have needed entirely new tracks. It seemed easier to start the ICE era in 1991 on existing old tracks, slowly building new ICE tracks, one after another, over the next 20 years.