
About that I-70 monorail to Vail, Colo.

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There has been a lot of discussion about the monorail along I-70 recently as Ali Hasan has made his support for such a monorail an important plank in his campaign to be elected to the state House of Representatives.

As former COO of Transport Ventures, the international consortium that proposed the high-speed monorail that was on the 2001 statewide ballot, I am writing to explain the situation.

There are several different types of system that are capable of running up I-70, that can go from Denver to Eagle. But that is not the issue — the dominant consideration is an economic one — unless we can figure out how the system will attract sufficient riders to be economically viable, it will never be built.

The citizens and politicians can stop the building of a transit system, but they can't will that it will be built. At the end of the process, that is the decision of the money providers.

Why would anyone ride a transit system? You have to get from your home to a station, buy a ticket, wait for the train, ride with others to the destination station, and then get from there to where you are actually going. Far easier to jump in your car and drive there, even if everyone else is doing the same thing and there is a lot of congestion.

In the U.S., there was no corridor where a rail transit system carried more than 5 percent of the people traveling along it, at least, until very recently.

This was a reason cited by Gov. Bill Owens for his opposition to a transit system up I-70 — that at the end of the day, it didn't make a significant difference to reducing traffic on the highway. The RTD's light rail system along I-25 is considered a fabulous success and has become a national model — but it carries just 7-10 percent of the traffic along I-25.

I-70 has several challenges that make it difficult to design an economically viable system:

- n The leg from Denver to Vail is the most challenging in the entire 40,000-mile interstate system. It has comparatively sharp twists and turns, it has long, steep climbs, it is subject to snow and wind, and it has a 4,700-foot change in elevation along its length.

- n I-70 also passes through beautiful country that demands environmentally sensitive and aesthetically pleasing solutions. The section of I-70 that passes through Glenwood Canyon was the most expensive section of the entire interstate system when it was built.

- n There is a only small population base at the mountain end that the system would serve.

- n It is a long way from Denver. The system would be much longer (and so more expensive to build) than most transit systems.

I-70 is congested, but 30 percent of the traffic along I-70 is trucks and RVs, or people passing through on their way to somewhere else who never could use the monorail. Capturing 10 percent of the traffic along I-70 would not be sufficient to make a monorail economically viable . We have to do better.

We don't need a typical transit system. We need one like no other. Millions of dollars and many, many man-years have been spent trying to figure out how — and I turn now to what we have learned.

Conventional trains are heavy (they have to be or the steels wheels would just spin uselessly on the steel rails), they are too heavy to elevate for any distance, they take tight curves slowly, they can climb only limited grades,

they are slow, they can't stop quickly, and their performance deteriorates as soon as there is snow.

Conventional trains, which were the main people movers in the United States a century ago, now move less than 1 percent of travelers.

In 1998, a major investment study was done of I-70 for the state Transportation Department by the engineering firm CH2M Hill. They explored alternatives, including the use of a high-speed conventional train (a French TGV) that could go 186 mph in places.

Because conventional trains can't climb steep grades, they estimated that it would need 40 miles of tunnels between Denver and Vail and would cost so much, and would attract so few passengers (who wants a subterranean ride through spectacular mountains?) that it would not be economic to build. The study recommended a not-yet-developed monorail system.

Five years later in 2004, a slow conventional train that could operate at up to 90 mph, but one that could climb steeper grades, albeit slowly, and so would not need so many tunnels, was explored by CDOT. This was done by consultants J. F. Sato who were doing the environmental impact study. They found that such a conventional train would cost \$4.9 billion and would attract few passengers.

They projected annual ticket fares of just \$83 million, which is not nearly enough to justify or finance such an expensive system. It would never be built. Needless to say, they did not recommend this solution.

Other conventional trains have been proposed: a cog rail, a FLIRT system (a conventional train similar to the one that was studied in the environmental impact study), but none of these would be close to being economic.

There has never been a study that demonstrated that a conventional train would be economically viable along I-70 and, I can confidently predict, there never will be. The physical and ridership realities do not permit it.

Next we'll finish with Part II of this article when I will discuss maglev, a transit solution that would work, the grand compromise, and Ali Hasan's proposal.

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I-70 monorail to Vail not so easy for Colorado

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Editor's note: This is the second of two parts by Thomas Hopkins, former COO of the international consortium that proposed the monorail test track proposal that failed in the statewide ballot in 2001.

Friday in Part I of this article we looked at the challenges that I-70 presents and why a conventional steel wheel on steel rail system would never be built. Today we look at maglev, the high-speed monorail proposed in 2001, and Ali Hasan's solution.

Maglev

Several maglev systems have been considered for I-70. These trains do not have wheels. They use magnetic levitation and magnetic propulsion.

A German Transrapid maglev train can go up to 300 mph. Only one has ever been put into commercial service and that is in Shanghai connecting the city to the airport. Transrapid was evaluated by CIFGA, the government agency that grew out of the Major Investment Study of 1998 and that was charged with figuring out what to do. The Transrapid system was rejected, as it was much too expensive and could not be steeply banked around curves and so would have to slow down in many places. China decided not to build any more of these systems.

Several slow-speed, maglev systems have been studied for I-70, also. The most detailed study was done of the Japanese HSST in 2004 for the state Department of Transportation. This is an urban system that can go up to 75 mph.

It was found that the train would slow down and overheat before it reached the Eisenhower tunnel and that its motor would have to be greatly improved. J. F. Sato estimated that it would cost \$6.1 billion to build and that it would attract few riders. Annual ticket revenues were estimated at \$86 million, not nearly enough to warrant such a capital outlay.

There has never been a study that demonstrated that a maglev train would be economically viable along I-70 and, I can confidently predict, there never will be.

New technology needed

Transport Ventures, of which I was a part, recognized in 1999 that none of the existing train technologies would work — a conclusion that the impact study had reached and that has been well demonstrated since.

We proposed using a wheeled vehicle that would wrap around an elevated guideway and that would be propelled magnetically. Specifically, we proposed taking a very unusual Spanish train and putting into it a linear induction motor that had been developed by Sandia National Labs.

We were using off-the-shelf technology and we could simulate its performance using computer models. It looked as if it would work and we estimated that we could build it from Denver International Airport to Eagle for \$3.9 billion (1998 dollars). We called it the "high-speed monorail."

In 1999, CDOT took our performance data and proposed ticket prices and had consulting firm HTNB conduct a survey to see what sort of ridership we would attract. They interviewed 4,147 people who drove I-70 or who arrived at DIA.

That many respondents is a massive survey. To put it in perspective, the national polls that are used to track who is winning in the presidential elections typically interview only 1,000 people.

HTNB found that 33 percent of respondents in summer and 39 percent in winter would definitely or very likely

get out of their cars and ride the high-speed monorail. The people arriving at DIA were even more positive — 45 percent of them would ride the monorail. We were looking at ridership equal to 30-40 percent of the traffic along I-70. It looked good.

Transport Ventures estimated that it could generate \$630 million per year in annual ticket revenues if, and only if, we had a very fast train, that ran frequently (every 15 minutes or less), ticket prices were low, quick-rent cars were available at the destination stations, and most importantly, we had a direct connection to DIA (which connection accounted for 64 percent of the revenues).

The operating profit on this was sufficient to support 80 percent of our projected capital cost. Dresdner, the German bank that is the world's second-largest financier of mega infrastructure projects, was on board with us. The great problem we faced was that our high-speed monorail was still a paper train. It had never been built. We requested \$50 million on the 2001 ballot to build a demonstration unit. But then we had 9/11 and that was the end of that. It was voted down, along with all money bills on the ballot that year.

Grand compromise

As the readers may know full well, the Gov. Bill Owens administration had been trying to force highway widening as the only solution, a solution that the impact study had carefully considered and had roundly rejected. We didn't like it, and the drumbeat of protest never stopped.

We had a change of administration and Gov. Ritter's team revisited the impact study. Earlier this year they engineered a compromise. There would be widening of I-70 in a few strategic locations in the short-term, and a transit system at some time in the future.

Until someone develops a high-speed, light-weight system that can twist and turn up I-70 at twice the speed of cars, we have to wait. There will be no monorail along I-70 until this happens. The grand compromise gives us time.

Ali Hasan

Enter Ali Hasan. He breezily suggests that it is easy — just pass legislation demanding it and it will happen. He proposes a maglev system and if you don't like maglev, he'll get us a conventional train — the very systems that prior studies tell us have no chance of working. I think Hasan is unaware of the history I just laid out and the real challenge. When you don't know much, things can seem easy.

Hasan claims he can build a maglev system that would cost \$10 billion for half that amount. He claims he can raise \$5 billion to finance it, but his scheme would raise zero dollars. He ignores ridership, as well he must. His recommended system would attract a fraction of what's needed. Hasan's proposal is uninformed nonsense.

Hasan claims to be a friend of the monorail, but some "friends" are not helpful. A legislator who runs about raising hope with such a proposal brings disaffection and discredits the whole monorail idea.

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