Trails and High-Speed Rail

Are They Compatible?

BY MIA L. BIRK, PRINCIPAL, ALTA PLANNING + DESIGN

Rails-with-trails (RWTs) — shared-use trails located adjacent to active rail lines – are found across the country, having increasingly gained acceptance by trail planners and the railroad industry. In August, 2002, my firm completed the final draft of the 4-year national Rails-with-Trails: Lessons Learned study.[1] The study was commissioned by the US Department of Transportation to identify the state of the practice in RWTs and develop recommendations for planning and design.

Most RWTs are situated next to low-traffic and/or low-speed freight rail lines. In the last few years, however, a number of RWT projects have been planned and developed in high-speed rail corridors.[2] One of these projects, the Coastal Rail-Trail in southern California, raised numerous questions about the trail compatibility with high-speed rail — in this case, a well-used rail line with trains traveling up to 90 mph.

Above: Acela high speed trains travel at speeds up to 90 mph.

Most Rails-with Trails are situated next to low-traffic and/or low-speed freight rail lines. In the last few years, however, a number of projects have been planned and developed in high-speed rail corridors.

Photos: Alta Planning + Design.

Above: Typical conditions along the rail line.

The Coastal Rail-Trail has been in development since the early 1990s. Parts of the trail (in the area of Solana Beach, Encinitas, Carlsbad, and Oceanside) will be located on the right-of-way owned by the North County Transit District (NCTD). The proximity of the proposed trail to the rail tracks — which carry a mixture of freight, commuter and regional rail traffic — brought up number of serious concerns, including:

- *potential hazards to trail users from wind and debris,*
- *likelihood of injuries in the case of a derailment,*
- *impact to NCTD future plans for double tracking,*
- *need for maintenance access, and*
- *security and safety needs in the wake of the events of Sept 11, 2001.*

Based on research of existing high-speed RWT projects, literature on high-speed rail aerodynamic impacts, wind velocity tests, and field analysis of the trail corridor, we found that wind and kicked-up debris resulting from passing trains would not create a significant impact on trail users at a 30′ setback distance.[3] Additional separation techniques (e.g. fences, landscaping) can reduce the impacts even further.

The Rails-with-Trails: Lessons Learned study found a high correlation between RWT projects and reduced trespassing, dumping, and vandalism, particularly in areas with a history of such problems.

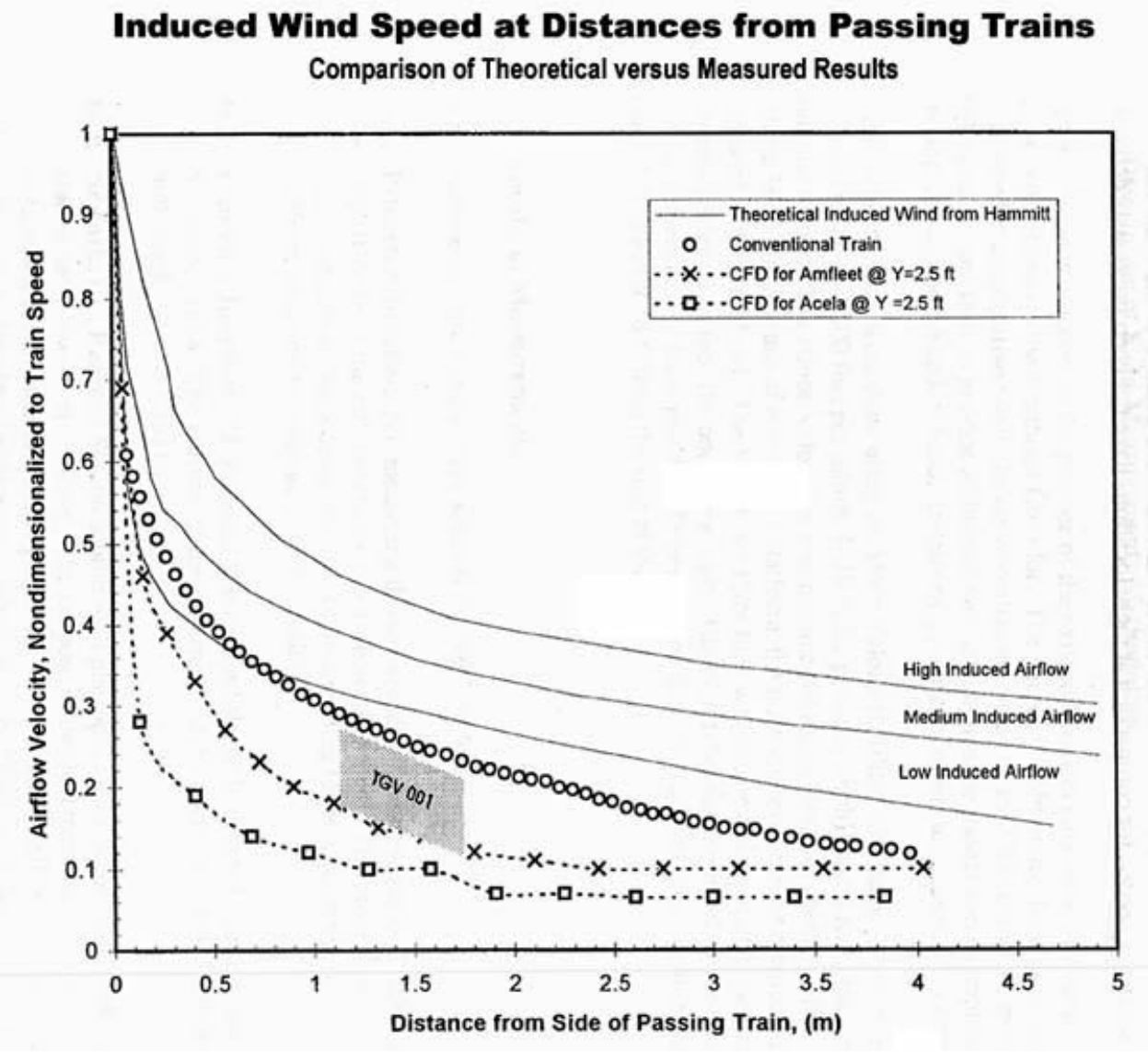
Above: Sidewalk in close proximity to trains at Encinitas station.

Setback distance must be determined on a case-by-case basis, as there is too much variation in field conditions and too few existing RWTs to offer a standard at this time.

Rails-with-Trails: Lessons Learned

The Rails-with-Trails: Lessons Learned study found a high correlation between RWT projects and reduced trespassing, dumping, and vandalism, particularly in areas with a history of such problems. This is because people who used to walk on or along the tracks chose to walk on the trail once it was provided, and because RWTs channelize users to safe crossings.

Setback distance must be determined on a case-by-case basis, as there is too much variation in field conditions and too few existing RWTs to offer a standard at this time. The study offers a range instead, with a minimum setback of 10 feet in extremely slow train speed conditions and a setback of 25 feet or greater in normal conditions. RWT designers should, of course, maximize the setback between trail and track as much as possible. The setback distance should correlate to the type, speed, and frequency of train operations, as well as the topographic conditions and separation techniques.



Above: The measured wind velocity from passing high speed trains is less than that projected through modeling.

The Northeast Corridor Trail in Newark (DE) is being built next to tracks that carry more than 100 high-speed passenger trains per day.

Analogous Situations

Of RWTs next to high-speed rail lines in the U.S. and Europe, the most analogous to the Coastal Rail Trail is the Northeast Corridor Trail in Newark, Delaware — a 1.7-mile trail under construction at this writing. It is adjacent to tracks that daily carry more than 100 high-speed passenger trains traveling up to 120 mph. The minimum trail setback distance is 30 feet, and the trail is physically separated from the tracks by a 7-foot chain link fence. The trail will also be used as a railroad maintenance road.

Train platforms on high-speed lines present a similar situation. On the East Coast, along the Coastal Rail-Trail itself, and throughout Europe, people stand in extremely close proximity to fast-moving trains on passenger train

platforms. Such situations are different from trails, however, in that people on train platforms can more easily anticipate and prepare for the passing train, whereas trail users may have their backs to the train. Bicyclists may destabilize if impacted by a strong wind gust. Furthermore, freight trains with open cargo present safety concerns not usually encountered at passenger stations. Thus it is important to locate the trail as far as possible from the tracks and include safety-oriented separation techniques.

Literature and Field Research

The Federal Railroad Administration conducted two reports in 1999 on the aerodynamic effects of high-speed trains (Lee[4] and Liao[5]). The reports concluded that beyond four feet, the air pressure effects on bystanders of trains traveling as fast as 150 mph are likely insignificant, and that a flat-nosed train traveling at 90 mph should not produce such winds beyond a distance of 23 feet. In addition, field research at the Coastal Rail Trail site found that train-induced wind speeds were consistently lower than had been predicted.

NCTD staff and consultants conducted a series of videotaped field wind velocity tests from July to October 2002 for the Coastal Rail-Trail project.

- *In the first videos, shot by NCTD staff and their engineering consultants, a 20-lb mannequin was placed at different distances from the track centerline. As the train passes, the mannequin blows over, its hat and scarf blowing down the tracks.*
- *My firm shot follow-up video in August 2002 using an adult staff person and his 10-year old son. At 15 ft. away from the tracks with no barriers, the wind, debris and sound impacts were high, while at 30 ft., they were minimal.*

Alta staff also shot video at the Encinitas Station in October 2002, holding a wind meter as the train passed at 90 mph. Staff stood 22 feet from the track centerline, on the sidewalk that is 18 feet from the track centerline on the opposite side of the passenger platform in Encinitas. As was found in the federal studies, at a distance of about 22 feet from the track centerline, there were no substantial wind effects — even when a flat-nosed train passed at 90 mph.

Conclusion

With regard to the Coastal Rail-Trail, Alta believes that the trail can provide a safe and useful facility for users without compromising train operations or safety. As of this writing, the trail is still under design, with the setback distance and the presence of the trail itself in question due to continuing NCTD concerns. Setback distance for any RWT should be correlated to various factors, including train speed and frequency. A well-designed trail should also provide mitigation measures such as:

- *Wind baffling materials such as fencing slats and vegetation.*
- *Sound walls.*
- *Grade differentiation between the trail and tracks (e.g., build the trail onto a berm).*
- *Ballasting to minimize dust and debris.*

The presence of high-speed trains is not a sufficient reason in and of itself to prevent a trail project. However, the special concerns associated with high-speed rail — primarily induced wind and kicked-up dust and debris — should be taken into consideration by the trail designer.

References

1 *Draft available at http://www.altaplanning.com/focus/rails_lessons.html. Final report to be published early 2004.*
2 *While "high-speed" technically refers to trains at 125-200 mph, and "higher-speed" to trails at 70-125 mph, "high-speed" is commonly used to describe all trains over 70 mph.*
3 *Setback is measured from the centerline of the nearest tracks to the edge of the paved trail.*
4 *Lee, H., Assessment of Potential Aerodynamic Effects on Personnel and Equipment in Proximity to High-Speed Train Operations, USDOT-FRA, 1999.*
5 *Liao, S., The Aerodynamic Effects of High-Speed Trains on People and Property at Stations in the Northeast Corridor, USDOT-FRA, 1999*

Mia Birk has 15 years experience in the transportation field, focused on energy-efficient and environmentally-sensitive planning, design and implementation. She is an Adjunct Professor at Portland State University, teaching Pedestrian and Bicycle Issues for Masters' students in urban planning. As a consultant, she has developed over 60 bicycle, pedestrian, trail, and corridor plans. While at the City of Portland (1993-1999), she developed Portland's Bicycle Master Plan and managed the public process, design and implementation of over 160 miles of new bikeways, thousands of bicycle parking spaces, and a bikeway maintenance program. She is a frequent contributor to bicycle- and pedestrian-related publications and has spoken at dozens of conferences.

CONTACT INFO:
Mia Birk, Principal,
Alta Planning + Design
(503) 230-9862
cell (503) 238-4745
www.altaplanning.com

NCBW Forum is an online publication of the National Center for Bicycling & Walking.
Editor: John Williams <john@montana.com>
To learn more, visit the ncbw forum site at ncbwforum.infop.cc
Or visit our main website at www.bikewalk.org.