Level Boarding: Decisions

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Why level boarding? Faster

• It speeds up service
• Consider a weekday all-stops local running from San Francisco to San Jose:
  – Diesel, no level-boarding: 1 hour 31 minutes
  – Electric, no level-boarding: 1 hour 21 minutes (-10’)
  – Electric, with level-boarding: 1 hour 16 minutes (-5’)

Level boarding is 50% as effective as electrification
Why level boarding? More reliable

- Predictable station dwell times make service more reliable
  - Transfers to BART, VTA, HSR are more robust (closely timed and reliable)
  - Capital-intensive infrastructure such as passing tracks for the blended system can be shorter (and cheaper to build) because tighter overtake timing is possible without risking delays
  - Less timetable padding → even faster service

Level boarding is important for blended operation
DECISIONS REGARDING INTEROPERATION WITH FREIGHT

START HERE

Level Boarding?

Yes

No

8” train floors or raise platforms?

8 inch floors

8” train floors not structurally possible

No change

Use deployable gap filler step?

Yes

No

Add lateral clearance with deployable gap filler steps (on train)

Add lateral clearance with deployable gap filler steps (on train)

Wider trains?

Yes

No

>128” (Plate F)?

Yes

No

Obtain waivers?

Track spacing?

Tunnel clearance?

Add lateral clearance by using wider passenger cars

Other Options?

Gauntlet tracks?

No

Yes

Retractable Platforms Edges?

No

Yes

GO 26-D clearance with gauntlet tracks

GO 26-D clearance with retractable platform edges

Never mind, No level boarding

Waiver GO 26-D?

No

Yes

Settle lawsuits from UPRR customers

No constraint on lateral clearances

Compromise with UPRR and BNSF on acceptable side clearance criteria

Keep freight?

No

Yes

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Go 26-D clearance with gauntlet tracks

Go 26-D clearance with retractable platform edges

Never mind, No level boarding

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Other Options?

Never mind, No level boarding

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Other Options?
CPUC General Order 26-D

CPUC = California Public Utilities Commission

- Sets side clearances where freight trains operate
What 26-D is intended for

All of this is irrelevant to the SF peninsula
Gauntlet tracks

• Required at every platform
• Capital cost: $$$
• O & M cost: $$
  – O & M = Operating & Maintenance
• Service impact: negative
  – Train must slow to a crawl entering and leaving each station

Expensive, slow and unreliable
Retractable platforms

- Required at every platform
- Capital cost: $$$
- O & M cost: $$
- Service impact: none

Folded up for freight

Expensive and unreliable
What compromise might look like

• 26-D side clearance: 2’ 8” of clearance beyond standard freight car width

• Could we compromise with platforms at...
  – 6 inches of clearance beyond standard car width?
  – 9 inches? A foot?
  – Compromise may also involve liability for “platform strikes”

• ADA allows only 3 inches from car to platform

Any compromise still leaves a gap > 3 inches
Waiver of General Order 26-D

• NOT AVOIDABLE if we are seeking an effective and affordable level-boarding solution

The time to initiate the waiver process is now
Gap-filler steps

- Deploy automatically from train, filling platform gap

Westbahn (Austria)
Stadler KISS EMU

Capital costs: $
O&M costs: $
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Keep freight?

No

Yes

Add freight

Use deployable gap filler step?

Yes

No

Retractable Platforms

Yes

No

No change
Extra wide trains

• Wider vehicle → narrower gap
  – Capital cost: $
  – O & M cost: zero
  – Service impact:
    • More space
    • More seats
    • More passengers

An attractive option when traffic is maxed out
Level boarding conclusions

• Level boarding is valuable
  – Cost-effective for reducing trip times and creating a reliable blended system
  – A waiver of General Order 26-D is the first step
  – Even with a waiver, it will take time and money

The community and elected officials should provide the support needed for Caltrain to achieve level boarding
Beyond Level Boarding: Platform Sharing
Jobs, jobs, jobs at Transbay

There are more jobs within ½ mile of Transbay than within ½ mile of all Caltrain stations combined!

All Caltrain and HSR should serve SF Transbay
Grand Central of the West?

New York  67 platform tracks on 2 levels

SF Transbay  6 platform tracks

SF Transbay is a very small and cramped terminal
The problem at Transbay

- Platform segregation
- All arriving Caltrain traffic must cut across (and delay) all departing HSR traffic, and vice versa

Two separate mini-terminals are even worse!
DECISIONS REGARDING PLATFORM HEIGHT

START HERE

- **Blend HSR and Caltrain?**
  - Yes
  - **Caltrain Level Boarding?**
    - Yes
    - **Platform Sharing?**
      - Yes
      - Convince CHSRA that security and fare collection issues can be addressed without dedicated platforms
    - No
    - **Separate Dedicated Platforms**
  - No

- No
  - **HSR with high (48”) Platforms?**
    - Yes
    - **Make Caltrain EMUs compatible with HSR platform?**
      - Yes
      - Cadilein can use high HSR platforms
      - No
      - **Procure EMUs with two sets of doors, high and low**
    - No
      - **Develop new technology to raise or lower entire platform**

- **Find 350 km/h, low entry, ADA compliant train architecture**
  - **Rescind Amtrak MOU**
  - **Convert Caltrain to high platforms, system-wide**
  - **Shared High Platforms**
  - **Shared Low Platforms**

**Note:** this is the standard for HSR in France, Germany, Belgium, etc. and even here in the USA (Acela Express)

**Legend:**
- Outcome
- Challenge
- Decision

**Note:** requires internal train lift for ADA
Platform sharing

• Practiced everywhere in the world where track gauge does not preclude it
Platform sharing for Transbay

- Reduces the number and frequency of conflicts (i.e. delays) in the station approach tracks
- Increases the overall throughput of the terminal, which sets the limit for all of California HSR
- Allows a scarce resource (platforms) to be dynamically allocated to actual (as opposed to predicted) demand patterns as they develop

Platform sharing can make Transbay “bigger”
Floor heights tend to be different

For shared platforms, *someone* must compromise.
DECISIONS REGARDING PLATFORM HEIGHT

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Caltrain Level Boarding?

Platform Sharing?

Separate Dedicated Platforms

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HSR with high (48") Platforms?

Convert Caltrain to high platforms, system-wide

Procure EMUs with two sets of doors, high and low

Caltrain can use high HSR platforms

Find 350 km/h, low entry, ADA compliant train architecture

Rescind Amtrak MOU

Develop new technology to raise or lower entire platform

Shared Multi-height Platforms

Shared Low Platforms

Shared High Platforms

Adopt a common platform height?

Make Caltrain EMUs compatible with HSR platform?

Note: requires internal train lift for ADA

LEGEND

Outcome

Challenge

Decision
Bi-level, high-platform EMU

They do exist!

Sydney

Paris

Moscow
Transition to high boarding

- Need to keep operating through transition
- Trains serve both high and low platforms
- Replace low doors with seats when done

Use EMU fleet to enable height transition
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              - Shared Multi-height Platforms

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Specifications:
- Procure EMUs with two sets of doors, high and low
- Caltrain can use high HSR platforms
HSR for low platforms

- Doesn’t exist (yet... since nobody asked for it)
- Could enable bi-level, higher capacity trains
- Diverges from Amtrak joint procurement

If CHSRA requests info, builders will answer the call
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Convince CHSRA that security and fare collection issues can be addressed without dedicated platforms

Start

Platform Sharing?

No

Shared Low Platforms

Yes

Adopt a common platform height?

No

No

No

Challenge

Decision

Outcome
Shared platform benefits for San Francisco

- More train traffic
- More ridership
- More economic activity
- More commercial success at Transbay

Shared platforms are great for San Francisco
Shared platform benefits for the Bay Area

- Lower capital costs in Millbrae
  - No need for underground facilities
- Lower capital costs in San Jose
  - No need for a massive double-deck HSR station (ACE and Amtrak need only 2 tracks)

- Easy to add a mid-peninsula stop... just make the Caltrain platform long enough (400 m)
What matters

• What matters:
  – Transbay capacity – sets statewide HSR throughput
  – Schedule reliability – key to blending Caltrain and HSR
  – Cutting capital costs – Millbrae, SJ and mid-peninsula
  – Multi-vendor solutions – no vendor lock-in

• What matters less:
  – The height of shared platforms – provided they’re shared
  – Designing around the current Caltrain fleet (25 inches)
  – Compatibility with Amtrak and ACE – segregate in SC/SJ
  – Compatibility with Amtrak’s Northeast Corridor HSR

Shared platforms will be controversial and difficult
 Compatibility... can we do it?

- Higher passenger capacity
- Lower costs
- A better passenger experience

Caltrain HSR Compatibility Blog: http://caltrain-hsr.blogspot.com
BACKUP
DECISIONS REGARDING ADA COMPLIANCE

START HERE

Level Boarding?

- Yes
- No

Continue using workarounds (mini-highs, bridge plates, in-vehicle lifts)

Obtain FTA clearance for wider gap

- Yes
- No

Operate with wider platform gap

Convert Caltrain stations to slab track

Develop actively controlled suspension on new Caltrain EMUs

Limit train speeds when passing platforms

Control train clearance to 3”?

- Yes
- No

3” gap achieved by precisely controlling train clearance

3” gap achieved by deployable gap filler steps (on train)