Crucial Concepts of High Speed Rail

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Crucial Concepts 1:
What is TTTT?
It’s Total Trip Time.
Shortest Total Trip Time.

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It is important to shorten Total Trip Time from origin to destination.

Values of 1 minute
- Shortening trip time 1 min. in station
- Shortening trip time 1 min. for transfer

Values of 1 minute on board, in station, transfer, first & last one mile, and so on are all the same

It is important to shorten Total Trip Time from origin to destination.
**Crucial Concepts 1: STTT**

Passengers are well guided through a station.

**Station structure**

- Conventional line Train
- Conventional line Platform
- Concourse (Conventional)
- Concourse (HSR)
- Automatic ticket gates
- HSR Platform
- HSR Train

**Passenger flow**

- Pass the gates at their own pace and follow the information to go
- Waiting rows on the platform for very short period before train arrival
- No ticket verifications on the train

**Example in Japan**

Boarding system to shorten the in-station time

- Purchase ticket with mobile device (Anywhere)
- Validation check and security check (Gate)
- Actual train departure information controlled by computer system is provided through all the process of departure.

**Turn up yourself on the platform 2 min. before departure.**
**Crucial Concepts 2: Through operation**

**High Speed**

**Through Service**

Maximum commercial speed: 200mph (320km/h)
Series E5 & E6 can be coupled and uncoupled automatically. Series E6 run through onto conventional lines.

**Series E5**

**Series E6**

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**Crucial Concepts 2: Through operation**

**Local city**

**Intermediate station**

**Tokyo**

Series E6

Series E5

Uncoupling:

**2’30”**

Coupling:

**4’00”**

No transfer

Automatic coupling procedure time

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Safety is the top priority for PT management (JR East has kept it and will keep it)

Punctuality is the mother for everything
1) reliance by passengers and society
2) competitiveness against other modes of transport
3) efficient operation requiring less infrastructure and rolling stock
4) reduced operation cost

In order to improve punctuality, an excellent operation plan, train schedule diagram, train control, maintenance, human resources, and so on are required.
What is **T L C C**?

It’s **Total Life Cycle Cost.**

Lowest **Total Life Cycle Cost.**

**L T L C C** model

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**Crucial Concepts 4: LTLCC (Low OPEX & CAPEX)**

Shinkansen technology and experience can minimize the need for facilities, rolling stock, and operating personnel.

**OPEX:**
1) Efficient Operation
   - Punctuality, Train schedule, Train control, Short Turn-around at station, and so on.
2) Efficient Maintenance
   - Rolling stock, Track, Overhead catenary, Signaling, and so on.

**CAPEX:**
1) Minimum Infrastructure
2) Minimum Rolling Stock

Higher efficiency needs only

Needs high efficiency of O&M

CAPEX will be saved as well!
**Quick 12-minute turnaround at the terminal station can**

- Provide very frequent service with minimum rolling stock
  - 4 minute headways = high frequency => *Minimum rolling stock (CAPEX)*
  - 415 trains per day in peak season

- Simplify station layout and infrastructure
  - Only 2 platforms with 4 tracks
  => *Minimum infrastructure (CAPEX)*

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**Essence of HSR management**

- **Safety**: The top priority for railway management
- **Shortest Total Trip Time (STTT)**
- **Punctuality**
- **Lowest Total Life Cycle Cost (LTLCC)**

**Increase in ridership**

**Low OPEX**
*Operation & Maintenance*

**Low CAPEX**

More feasible plan

Mutual relationship


**Crucial Concepts 5: Design of System Integrity**

From the planning stage of HSR,

- Civil engineers
- Track engineers
- Electric engineers
- Signal engineers
- Rolling stock engineers
- Operation and Maintenance engineers

work tightly together

Total system integrity

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Thank you very much for your attention