STATION ARCHITECTURAL DESIGN: Economic Impact Assessment. The day after.

17-18 October 2013

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4-A Sustainable Stations
What are we going to talk about?

The aim of this lecture is to present ADIF’s STATION HANDBOOK and the reason why it was born:

- To gather Adif’s experience of the past years, in the design, construction, management & operation of High Speed and Conventional Spanish Stations.
- To ensure that values acquired from operation & maintenance during the life cycle of a station are considered as Station Design Principles.
What does “the day after” mean?

The day after is the day when the lifecycle and the operation activities of a Station start. Therefore, Stations besides being beautiful, functional, and acting as city landmarks, must above all be maintainable and economic sustainable during their whole life cycle.
Our role as architects experts in O&M

To give technical support to needs arising from O&M activities. However, this task is not always easy to accomplish because 

DECISIONS made during DESIGN STAGES compromise around 80% of stations OPERATION and Maintenance COSTS.
Our Experience: Factors that condition Operation

- FUNCTIONAL PROGRAMME
- STATION SIZE
- ARCHITECTURAL DESIGN
- OPERATION
- OPERATION COSTS
- MAINTAINABILITY
- MEP COMFORT LEVEL

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Match the functional programme, railway, retail, front of the house and back of the house uses, to the different type of stations.

Adjust the station’s size considering initial passenger forecast and plan station future extensions.

ADJUSTED SIZE, MODULARITY & FLEXIBILITY

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**Budget Control** by using different types of materials and finishes depending on the station type:

<table>
<thead>
<tr>
<th>St. Building</th>
<th>Platform finishes</th>
<th>Canopies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.000 – 3.200 €/sqm</td>
<td>20 – 100 €/sqm Concrete / granite</td>
<td>350 – 500 €/sqm</td>
</tr>
</tbody>
</table>

**MEP & Back of the House Services** as an important part of the project:
- Represent up to 20% of Station area.
- Rooftops, service galleries and glazed walls must be accessible for maintenance operations.

**MEP ACCESSIBILITY & STANDARDIZATION**
**Vertical communication elements.**

Annual maintenance costs:

<table>
<thead>
<tr>
<th>Elevator</th>
<th>Escalator</th>
<th>Mech. ramp</th>
<th>Fixed Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.000 €/year</td>
<td>2.500 €/year</td>
<td>4.000 €/year</td>
<td>0 €/year</td>
</tr>
</tbody>
</table>

**Maintenance budget.**

- Electrical: 30% medium-low voltage, lighting.
- HVAC: 40% heating, ventilation and air conditioning.
- Others: 30% plumbing, sewage, fire protection.

**SECTORIZATION, REGULATION, SYSTEMS MANAGEMENT**

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Our experience put down into words

Adif Stations Handbook (1300 pages)

|----------------|-----------------|-------------|----------------------|-------|-----------------|

6. Signage  
7. Intermodality  
8. Retail Design  
9. Management  
10. New Technologies  
11. Sustainability

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New approach: Station life cycle

Values acquired from operation & maintenance must be considered as Station Design Principles.

Needs → Project phase → Building phase → OPEX

The design of Stations must allow them to ADAPT and EVOLVE because they are living artefacts in constant CHANGE.
Thank you for your kind attention

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