Case Study

Berlin Brandenburg Airport (BER), Germany

How MEP Planning Failures Delayed a Mega Project by Nearly a Decade

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1. Project Overview

- **Project Name:** Berlin Brandenburg Willy Brandt Airport (BER)
- **Location:** Berlin, Germany
- **Client:** Berlin Brandenburg Airport Company (public sector)
- **Original Planned Opening:** October 2011
- **Actual Opening:** October 2020
- **Original Budget:** ~€2.5 billion
- **Final Cost:** ~€7 billion+

Project Type: Large public infrastructure – Airport construction

Core Problem Area: MEP (Mechanical, Electrical & Plumbing) systems, especially **fire safety and building automation**

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2. Project Objective

To build a **single, modern international airport** to replace Berlin's multiple aging airports, integrating:

- Terminal buildings
- Advanced baggage handling
- Complex fire detection & smoke extraction systems

- Integrated HVAC, electrical, and life-safety systems

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3. What Went Wrong? (The MEP Story)

The project did

not fail because of concrete or steel

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It failed because of **MEP planning, coordination, and integration failures**.

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4. Key MEP Planning Issues

4.1 Fire Protection & Smoke Extraction System Failure

- The airport required an **automated smoke extraction system** to control smoke in case of fire
- The system was:
    - Poorly designed
    - Incorrectly wired
    - Not integrated with fire alarms and building controls

👉 **During testing, the system did the opposite of what it should do**

Instead of extracting smoke, it **pushed smoke into passenger areas**

4.2 Lack of Integrated MEP Design

- HVAC, fire alarms, electrical controls, and building management systems were:
    - Designed by different teams
    - Not coordinated through a single integrated MEP model

- Thousands of:
    - Cables were wrongly routed
    - Sensors were incorrectly placed
    - Control logic was inconsistent

👉 Result: **Systems worked individually, but failed collectively**

4.3 Late Design Changes (MEP Rework Spiral)

- Architectural changes continued **after MEP installation had started**
- This forced:
    - Re-routing of ducts
    - Re-laying of cables
    - Replacement of already installed equipment

👉 MEP rework became continuous and uncontrollable

4.4 No Single Owner for MEP Integration

- No clear **MEP Integration Manager**
- Multiple contractors blamed each other:
    - Electrical blamed HVAC
    - HVAC blamed fire safety consultants
    - Consultants blamed late client decisions

👉 **Coordination vacuum = decision paralysis**

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5. Impact on the Project

Schedule Impact

- Opening delayed by **almost 9 years**
- Multiple announced opening dates cancelled at the last minute

Cost Impact

- Billions spent on:
    - Rework
    - Idle facilities
    - Maintenance of a non-operational airport

Reputation Impact

- Became a **global example of project management failure**
- Loss of public trust in government infrastructure delivery

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6. Why This Is an MEP Planning Failure (Not Just Execution)

Area	What Should Have Happened	What Actually Happened
MEP Planning	Integrated MEP master plan	Fragmented discipline-wise plans
Coordination	BIM-led clash detection	Manual, late-stage coordination
Governance	Strong MEP systems integrator	No single point of accountability

Testing	Progressive system testing	Late, big-bang testing
Change Control	Frozen MEP design early	Continuous late changes

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7. PMBOK 8 Perspective (Principles Applied & Violated)

Violated PMBOK 8 Principles

- **Principle: Build Quality into Processes**

  ❌ Quality was inspected at the end, not built-in

- **Principle: Tailor Based on Context**

  ❌ Mega MEP complexity treated like a normal building project

- **Principle: Enable Effective Stakeholder Engagement**

  ❌ Poor coordination between designers, contractors, and authorities

- **Principle: Optimize Risk Responses**

  ❌ MEP integration risk was known but not proactively managed

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8. Key Learning for Construction & MEP Students

🔴 Core Lesson:

In modern construction projects, MEP is not a support system—it IS the system.

Practical Takeaways:

- MEP planning must start **during concept design**
- Appoint a **dedicated MEP Integration Manager**
- Freeze MEP layouts early

- Use **BIM as a coordination tool, not a drawing tool**
- Test systems **incrementally**, not at the end

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9. Discussion Questions (For Classroom / FDP)

1. At which project phase should MEP integration risks have been identified?
2. How could BIM have prevented this failure?
3. Who should own system-level accountability in MEP-heavy projects?
4. Can a project be considered “structurally complete” but still a failure?
