

# Responsibility

# from concept beyond completion





# Facade Experience

Priedemann was founded in 1993, since then, a simple mission moves us: To do the ONE thing, that makes our heart beat – FACADES.

That knowledge is grounded in German craftsmanship and continuously improved by stretching our boundaries through research and daily challenges. Only best practice is not enough for us.

# Building Skins

Facade Consultancy & Engineering Services

We are focused on Facades: Priedemann Facade Experts are global operating engineering offices with the focus specifically on the building envelope. In a unique way we make our holistic full-service facade competency available to investors, architects and building contractors. Beside façade consultancy and third-party execution control, we develop the system design and prepare the final shop drawings. Mastered facade techniques, brave to own responsibility and the passion to chase nearly impossible objectives are our strengths.

#### Services

Whether it is the comprehensive consultancy package or a single engineering discipline; our clients can rely on Priedemann's competency from project conceptualization to the stages beyond commissioning. We understand the envelope as an interface to almost all adjacent trades and we consider ourselves as the partner of all five main construction participants, namely the investor/ developer to the architect/ general consultant, the general contractor and the façade fabricator extending finally to the supplier of the envelope's components and materials. Over 1,000 successfully completed projects world over and long-term client relationship tells its own tale.

#### **Beyond standard Solutions**

Dare to tackle something new, exceed expectations – Priedemann Facade Experts stands for innovative solutions with a practical approach. Beside applied implementation of sophisticated facade projects in all climate zones, we contribute in research and engage in professional knowledge exchange. The Facade-Lab, a subsidiary of Priedemann, drives the quest for innovative facade solutions and develops specific and customized products. We develop and test these products together with our partners from the science and research industry. In addition, a separate facade forum offers a platform for the exchange with colleagues and manufacturers. In a showroom of 750 sqm we exhibit over 60 mock-ups, material samples and information.

# **Continuous** Support

So when a project begins - or at any time in the planning phase when Priedemann Facade Experts are involved - we clarify the need of intentions.

As we guide from A-Z, we believe a guide needs to have the practical execution experience; to the extend that if the party who executes shows any kind of resistance, the façade consultant shall be able to take over the challenge to show forward. As an independent practice, we are obliged to the entire life cycle of a building skin.

We love to start as early as possible such as with an architectural competition and we do not stop where the interfacing starts.

## Responsibility from concept beyond completion



# **Continuous** Support

With the most diverse projects reallized we are apt to be the responsible partner for all facade matters, thus you can have the peace of mind that we do close the gap between design and execution.

This avoids losing key project information and enables the team to achieve a higher level of efficiency, quality and cost certainty.





# **Clients as** Partners



Our clients range from architects, developers, general contractors, fabricators to system suppliers.

The difference arises from the responsibility, for each planning stage and every customer

We are constantly aiming to deliver the best possible services to our clients, sharing their prime interest of accomplishing a well-constructed project. Supporting them from the first concept sketch in an architectural competition until the last screw is tightened on the building, as well as during the entire operational phase



## **Continuous Support** Size beyond limits

## **RMK New Headquarters** Yekaterinburg, Russia



- Pre-Tender: Foster + Partners

- Post-Tender: Diamond Building

Owner **Russian Copper Company** 

Architect Foster + Partners

#### **Project Data**

- approx. 90 m building height
- approx. 12,500 m<sup>2</sup>
- facade surface

**Building Function** Office

#### **Technical Features**

- Diamond shaped facade
- Oversized elements, max. element size
- 12 m height, 6 m width
- Semi-unitized curtain wall
- Coloured stainless steel cladding

#### **Consultancy Services**

- Detailed/Developed Design
- Technical/Construction Design
- Specification/Tender Documentation
- Tender Evaluation

#### **Engineering Services**

- System/Concept Design
- Structural Design
- Mock-Up Development
- Provision/Shop Drawings
- Material Take Off
- Production Documentation
- Installation Documentation

#### **Special Services**

- 3D Modelling
- Maintenance, Cleaning, Facade Access, BMU

Status



RMK New Headquarters during construction progress



Façade 3D Model, different element sizes



Shop drawing, horizontal section of unitized curtain wall



Mock-Up on site, January 2017



Digital production of a junction detail

Completion 2020

## **Continuous Support** Size beyond limits

## RMK New Headquarters Yekaterinburg, Russia



Facade Design responsibilityy from the first idea sketches...



to entire 3D building envelope modelling....



followed by simple cardboard and 3D-printed models...



and parametric 3D volume models....



for producing and proving the performance mock-up...



to implement the 1:1 visual mock-up on site in Yekaterinburg...





and finally we provide all the shop drawings and production documents to ensure the design by Priedemann Know-how for Russian capacities during assembling in the local factory and installation on site.

# **Facade** Consultancy

Priedemann is dedicated to provide Facade Consultancy and Planning all the way through the complete project execution and building life cycle.





### Architectural Competitions

Share to perform

We are happy to get involved as early as we can.

We love competitions, regardless of whether we can be creative facade experts in the team of architects or experts on the client side.

We support innovative and future-oriented concepts, new technologies and solutions with realistic cost calculations.



### Refurbishment

Minimum interference, maximum expertise



Priedemann offers comprehensive knowledge of materials, types of construction and construction methods for assessing the quality and value of the inventory with minimized depth of interference with the material.

Taking into account listed buildings, economic and design requirements such as preservation of individual details, renovation during ongoing operation, gutting with new extension, etc., we develop targeted renovation concepts for the facade on the basis of precise measurements as well as material, strength and load-bearing capacity analyses.

# **Our** Services during Pre Tender

### Project Objectives and Brief

Everything covered, clear objectives

At Priedemann any project starts with the determination of the planning basis, with the facts, requirements and possibilities – no matter when we start and always together with everyone involved in the project.

- What is the design concept?
- Which local standards apply?
- Urban planning requirements?

- Energy requirements?
- Weighing up the priorities in the "magic triangle" of quality, costs and duration
- Definition of an objective as a benchmark for all subsequent planning phases
- Development of the evaluation criteria as expert assessors in architectural competitions

### Concept/Schematic Design

#### Ideas meet reality

We design different variants based on the strategic objectives, we identify their advantages and disadvantages and keep on developing the preferred solution.

- Sketches of concepts drawn by hand
- Taking into account different options for materials and the construction
- Inclusion of structural and thermal loads
- Dependencies in the building structure are taken into consideration
- The physics of the building and acoustic requirements are taken into consideration
- Fire protection and smoke extraction are taken into consideration

- Cleaning and maintenance plan, access at heights
- Outlining solutions, costs and timings
- Inclusion of existing solutions to clarify the design
- Support during the initial sampling
- Documentation in report form
- Ongoing updating or further development of the design





### Detailed/Developed Design

Thinking ahead in detail

Priedemann develops the facade concept for planning ready for approval – taking into account all planning principles and requirements determined up to that point, e.g. the climate plan, building technology and building statics.

- Detailed hand-drawn sketches
- CAD-based layout plans and CAD-guided details
- 3-dimensional analysis of the shell of the building for complex facades
- Selection of the materials and type of facade
- Drafting of the facade plan based on the building physics and acoustic specifications
- Integration of fire safety and smoke extraction plans
- Security requirements are taken into consideration
- Collaboration on the overall design so that it can be approved
- Joint design, joint width and depth in accordance with the building movements identified and relevant tolerances
- Documentation in report form
- Ongoing updating and further development of the design, cost estimate and construction scheduling
- Support in the planning and implementation of 1:1 facade samples to ensure that the design is progressing as intended, e.g. in design-and-build processes







### Technical/Construction Design

#### Passion for precision

Priedemann sees the implementation planning as a precise simulation of the construction process and the building – in detail, digitally and, depending on the complexity, as a 3-dimensional model. Assessment of the planning approval (IFC Drawings) for completeness and feasibility.

- Guide-detail planning as CAD drawing on a scale of 1:1 with all connections to adjacent components
- Detailed representation of the layers, components and individual components of the facade solution supplemented by material descriptions and dimensioning
- Planning on the basis of static pre-dimensioning for the relevant facade components – glass, profiles, fixings
- Advanced planning for the building physics and acoustics
- The specified security and fire safety requirements are taken into consideration
- Planning and integration of control and operating components
- Updating costs and the construction schedule
- Agreed plan for the materials
- Glass specifications







### Specification/Tender Documentation

Defining the details with a view of the whole project



For tendering and awarding contracts Priedemann defines and specifies the planned facades and details as well as the connections to adjacent components.

- Summary of technical requirements as well as client and user specifications for construction and materials as "Technical Preliminary Remarks".
- Compilation of the design and additional technical criteria in coordination with the planning team
- Drafting of the service description
- Individual quantities and components are recorded
- Differentiation of the various trades when awarding contracts to different contractors, clear definition of the interfaces
- Collation of all documents in a single set of documentation

### **Tender Evaluation**

Comparing. Evaluating. Recommending.

Priedemann provides clients with comprehensive advice independent of individual manufacturers and systems when selecting the best award procedure and the most suitable manufacturer.

- Comparison and evaluation of the tenders that have been submitted
- Creation of price comparison lists
- Evaluation of alternative providers
- Evaluation of the qualification certificates of the facade manufacturers
- Assessing the capabilities and capacities of potential contractors
- Involvement in the discussion when contracts are awarded

We know the market: Our experience from hundreds of projects with various manufacturers is incorporated into our consulting services.



# **Our** Services during Post Tender

### **Design Compliance Control**

Checking. Coordination. Optimizing.

The first phase after the award of the contract is of particular importance. Often some time has passed since planning and a number of changes may have occurred, the planning team has changed, user requests have been added or additional requirements are putting pressure on the budget. Priedemann checks and assesses whether all the documents are up to date, complete, feasible and if any improvements can be made, coordinates change management and is the contact for all questions of the planning team concerning the facade.

#### Before the work is planned

- Checking that the documents provided are complete
- Comparison with possible project changes and updates
- Determining the status quo for the start of construction
- Checking the system components to be implemented
- Clarification of unresolved questions, communication with the planning team

#### While the work is being planned

• Priedemann checks and comments on the contractor's structural assumptions as well as the performance in terms of energy and acoustics

- Checking and evaluating the contractor's work schedule
- Checking relevant facade elements and how they interface with other trades
- Evaluation of the contractor's planning and system design
- Checking of technical specifications for materials such as glass, stone etc. as well as data sheets for sealing and insulating materials, surfaces, system descriptions etc.
- Checking and assessing the facade supply chain for compliance with the applicable guidelines as well as technical and quality standards
- Comparison of test data with specified or actual performance data
- Updating change management

#### Additional services

- Investigation of options for production, materials and technology, if necessary, making improvements whilst retaining the agreed qualities, costs and dates for implementation
- Evaluation of facade materials that the facade manufacturer provides as an IFC (issued for construction) alternative
- Statement on the suitability, quality and equivalence of alternative material proposals in relation to the materials in the original plans
- Assessment and evaluation of the behavior of the products when processed





### Mock-Up Association

Expertise with façades 1:1.

Scale does not just change the perspective and the proportions, only in the 1:1 model can the loads a component is exposed to be tested realistically.

Usually, mock-ups are only created after being awarded to the manufacturer of a facade. We support the planning and implementation already during the planning phase in order to ensure greater reliability of planning, design and implementation at an earlier point in time.

#### **Physical mock-ups**

- Support and advice when carrying out facade tests
- Control of the standards and requirements to be met, involvement in tests
- Evaluating and commenting on the test reports
- Recommendations for potential improvements

#### Visual mock-ups

• Support and advice on the construction of a facade sample to match the design requirements



### **Execution Compliance Control**

#### Checking. Improving. Documenting.

The supervision of assembly and installation is particularly important for us, to ensure the agreed quality. Our principle is that deviations from the agreed planning must be identified at an early stage, documented and the implementation corrected. This controlling refers both to production and manufacturing as well as to the assembly on the building site:

# Regular inspection of production and assembly in the factory

- Verification of compliance with the approved design, ensuring compliance with the agreed qualities, standards and test series
- Regular reporting on production progress; the reports contain recommendations for possible improvements as well as a list of unfulfilled services, performance arrears, defects identified

### Execution Compliance Control (continued)

Checking. Improving. Documenting.

#### Regular inspection at the building site

- Verification of compliance with the approved design, ensuring compliance with the agreed qualities, standards and test series
- Inspection of examples of facade sections as reference values for determining the quality of workmanship – benchmark inspections
- Involvement in performance tests on the facade on the building site (water impermeability, sound insulation, blower door test, etc.)
- Random inspection of the installation work on the building site
- Regular reporting on the installation work including the identification of discrepancies with the original planning



### Variation Claim Evaluation

Staying flexible, limiting costs.

To enable rapid and flexible reactions to changes, the planning and der current status are continuously updated and documented. This enables control over ongoing work and avoids potential disputes in the event of interruptions, extensions, delays or rising costs.

- Technical evaluation of the contractor's requests for modification in accordance with the specification and agreed standards
- Comparison with the relevant current status
- Assessment of alternatives to the proposed changes
- Assessment of new solutions for conformity with IFC (issued for construction) alternatives

### Handover, As-Built Documentation

Thinking above and beyond from start to finish.

At Priedemann, we schedule all relevant issues and cost points right up to the handover. For acceptance, we can compile a complete package of all important documents to ensure operation and maintenance of the facade as well as a detailed digital documentation of the final performance or to check its completeness.

- Final acceptance inspection with developers, architects and the project management team
- Documenting the final inspection with concluding observations and further recommendations
- Documenting the final facade details with all construction drawings and calculations of the statics and building physics
- Handing over and compiling the operating and maintenance manuals
- Checking that all of the documents are complete



For project references, please visit www.priedemann.net

# **Our** Services in Use Phase

### In Use Consultancy

Maintaining values. Increasing performance



Finding and fine-tuning the right "adjusting screws" for optimum facade performance during ongoing building operation is part of Priedemann's holistic approach: From recommending the optimal cleaning system to damage assessment and strategies to limit and repair any damage through to a detailed valuation, we offer a comprehensive consulting service.

#### **Maintenance and Optimization**

- Advice on pending maintenance work on the basis of project documentation or after stocktaking
- Advice on repair or replacement of components
- Analysis and recommendations on how to improve the performance of the facade
- Recommendations on cleaning and accessing the facade

# Defect and Failure Investigations | Expert assessments

- Drafting of expert reports during the utilization phase,
- on direct damage that has occurred,
- on the functional and thermal quality of the building shell
- research into the causes of damage and proposals to remedy them

- Recommendations for refurbishment or renovation
- Consideration of time-related and financial effects

#### Due Diligence | Risk assessment

- When selling, renting, leasing or otherwise disposing of property, we assess the quality, remaining life and retention of value for the facade
- Evaluation of the test results and agreement of possible strategies together with the client including comprehensive documentation of the results research into the causes of damage and proposals to remedy them

# **Facade** Engineering

Our Engineering approach demonstrates very specific and comprehensive facade know-how.



# **Our** Services during Post Tender

### **Construction Objectives and Brief**

Defining the basics for implementation

With the award of the contract, we check the contractual framework conditions as the basis for the implementation. If necessary, we adapt the technical solutions to any requirements that have changed – always with the goals of our client in mind.

 Contract review, determination of the contracted services and if necessary, developing alternative solutions

- Operational management, cost and budget audits
- Assessment of technical amendment suggested by the contracting parties, assessment of proposed modifications
- Evaluation of implementation alternatives to the approved diagrams (IFC Issued for Construction Drawings)
- Definition of the main strategic objectives as the basis for a coordinated facade design

### System/Concept Design

Getting the whole picture - right down to the last detail.

Priedemann stands for system and facade concepts that think ahead with detailed solutions and technical feasibility even before the contract is awarded, always keeping an eye on the project as a whole and maintaining the project's design standards even after the contract has been awarded.



- Development of the constructional facade concept on the basis of an integrated procedure together with the developer's design team
- Development of a technical plan for all of the different facade areas, types and elements
- Project-specific adaptation of existing facade systems, creation of bespoke project solutions
- Design of all typical details as the basis of the structural design plan
- Optimization of production, manufacturing and assembly for the best possible cost-benefit ratio

### Structural Design

Analyzing. Calculating. Proving.

Depending on requirements, Priedemann analyzes and calculates the static requirements of e.g. profiles, glazing and fixings in 2 or 3 dimensions or as finite elements. Evidence is provided on the basis of the applicable international or national standards.

- 2D construction analysis and detailed 3D analysis as needed
- Profile and glass structural specifications
- · Calculation and analysis of finite elements
- Project structural analysis as documentation for the relevant auditors
- Structural evidence depending on the region based on EN standards or Eurocode, British Standards or American Standards.

### Mock-Up Development

Development of 1:1 sample façades. Under real conditions.

Climate, wind and weather – the reality for a design is always tougher than the theory. Especially with innovations and customer-specific solutions, material and performance tests under real conditions are indispensable. The development of mock-ups and the coordination and monitoring of numerous load tests are central components of our services.

#### Architectural, visual mock-up (VMU)

Consultation with the developer for the design of a sample facade, on site or on Priedemann's own premises, preparation of technical drawings and specifications, product and material research, preparation and compilation of factory and assembly drawings (assembly drawings, installation drawings), advice when selecting the most suitable manufacturer, coordination where adaptations are required



(Scope continues on next page)

### Mock-Up Development (continued)

Development of 1:1 sample façades. Under real conditions.



#### Test facade, performance mock-up (PMU)

Consultation with the developer for the design of a sample facade and the necessary test requirements, preparation of technical drawings and specifications, product and material research, preparation and compilation of factory and assembly drawings (assembly drawings, installation drawings), advice when selecting the most suitable manufacturer

#### On site facade test

Consultation with the developer on on-site tests on the final elements or those actually installed, blower door test (test for airtightness), site camber test (on-site load test of a defined section of the realized facade or facade mock-up for air and water permeability and structural loads)

### Provision/Shop Drawings

The "how" is what's important.

If Priedemann takes over the shop drawings or the workshop planning for the contractor of a facade project, we first check the existing planning approval for completeness and feasibility. In discussion with the developer and his planning team, we coordinate all planning-relevant parameters and adapt them, if necessary, to the equipment of the contractor – our client.

- Assessment of the planning approval (IFC Drawings) for completeness and feasibility
- Optimization of the design and assembly plan according to the needs of our client
- Clarification of the division of responsibilities and planning-relevant parameters in coordination with the developer and client
- Drafting of the workshop plans (Shop Drawings)
- Our planning includes the construction in all sections as well as the identification of all materials, qualities, fittings and surfaces
- Review and adaptation of drawings during the approval phase





### Material Take Off

#### Competence with the market and materials. Worldwide.

In addition to careful planning, the quality of the products and materials used is decisive for how well a facade performs and how long it lasts. Our knowledge is guaranteed and supported by our experience and application-oriented research in the Facade Lab. The exact definition of the materials to be used, their quality criteria and how they should be processed is part of our range of services.

- Preparation of the orders for all necessary materials
- Checking the technical data submitted for the materials
- Comparison of the materials proposed by the contractor with the specified materials
- Development of project-specific quality criteria, e.g. for facade profiles

- Finding the best price around the world and global market research
- Cut lists for fixed length optimization, gating angle, surface treatment, allocation to assemblies and construction lots
- Identifying and establishing surface sizes and qualities
- Determination of material tolerances, hole and milling patterns, weld seam designs, glass specifications, edge processing, etc.
- Breaking down the material order quantities depending on the design types, delivery times and production or assembly sequences
- Material order codes for prefabricated parts such as laser cuts or sheet metal edge parts, turned and cast parts, complete assemblies and glazing

### **Production Documentation**

#### Planning and then: Controlling. Optimizing. Automating.

Priedemann supplies all planning documents for the construction of the planned facades. We familiarize ourselves with the potential of the respective production site and capacities and monitor the entire manufacturing process right through to the supply of materials on the construction site. The CAD and CAM data generated by us makes our clients ready for industry 4.0: This is how we bring the design directly to the machine!



- Preparation and provision of construction drawings (Working Drawings)
- Compilation of all documents from the shop drawings with the production drawings and installation drawings, the static and structuralphysical calculations right through to the material lists
- Supervision of production on site, inspection of the production site, provision of a detailed inspection report with indication of differences to the planned execution, development of proposals for solutions

(Scope continues next page)

#### Production Documentation (continued)

Planning and then: Controlling. Optimizing. Automating.

- Industry 4.0: Online data transfer, CAD and CAM plans for automated production
- Analysis and optimization of material flow and transport locally within the production site and on the construction site
- Identification of individual parts with allocation to individual production lots according to quantity, size and design

### Installation Documentation

Defining procedures. Considering the use of materials. Planning logistics..

The quality assured during manufacture and production is to be maintained continuously on the construction site. To do this, we coordinate the correct sequence for an efficient assembly process. Priedemann thinks through all steps and interfaces, creates clear installation and assembly instructions and pays attention to interfaces with other trades.

 Specification of the assembly and logistics sequence

- Installation and assembly drawings (Installation Drawings)
- Preparation for the installation and information on the individual elements and parts
- Preparation of installation plans as well as plans for subassemblies and fixings
- Creation of separate drawings for components to be integrated, such as sun protection, revolving doors, etc.
- Assembly documentation





### As-Built Drawings

Taking care right to the end: Our knowledge in your hands.

With the final phase of the project, Priedemann coordinates the handover of the completed facade to the client. For us, this includes a joint inspection tour on site as well as clear documentation of the finished facade, a comprehensive operating manual with corresponding explanations and drawings and a final meeting with the client.

- Acceptance tour with the team consisting of the client, architect and project management
- Final report based on an on-the-spot inspection of further observations, recommendations and explanations
- Final meeting with the client's representative with presentation and explanation of the report
- Preparation of the As-built Drawings, the documentation of the facade that was actually built

For project references, please visit www.priedemann.net

# **Priedemann Facade Experts**

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Dubai

0

Nairobi

Berlin

Thinking global – Acting local

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Houston

Sydney

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