



ArcelorMittal

Composite Slim-Floor Beam (CoSFB)



ArcelorMittal received Engineering Award for Composite Slim-Floor Beam (CoSFB)

ArcelorMittal Europe – Long Products, Technical Advisory

ArcelorMittal Europe – Long Products is awarded by the German Steel Construction Industry for the development of “CoSFB”, an innovative concrete dowel technology. This innovation is part of the design of CoSFB (Composite Slim-Floor Beam) a new ingenious floor beam. The price ceremony will take place at the fair “BAU 2015” in Munich on the 20th January 2015.

The development of “CoSFB” was initiated by the Technical Advisory Team in Esch-sur-Alzette, Luxembourg. Key of this success story was the close collaboration and the early involvement of ArcelorMittal Construction France and ArcelorMittal Global R&D, Esch-sur-Alzette. Consensus about the actual and future market demand was quickly leading to the decision to develop a new shear connector for integrated floor beams, CoSFB-Betondübel.

Thanks to an immediate project launch test results were already available after six months. This allowed for a direct implementation of this new technology in first reference projects. The parallel improvement and development of slab elements - Cofradal 260 (Figure 1) and Cofraplus 220 with slim-floor connector - completes the product portfolio and provides sustainable and economic floor solutions to ArcelorMittal customers.

The implementation of this solution in EU markets started. It will help to strengthen the share of hot rolled sections in construc-

tion application. CoSFB is a **sustainable response** to the market demand and **fills a gap in the construction sector**. As such, it is expected to contribute strongly to the increase of ArcelorMittal market share in the construction market – for residential, commercial and industrial application. References exist in Luxembourg (Figure 2) and France (Figure 3). Since August 2014, a National Approval for **CoSFB is available for the German market** (Z-26.4-59). Based on this approval, the technology is prescribed in first project tenders.



Figure 2: Bâtiment Offermann, Mersch (Luxembourg)

Technical Background

Slim-floor construction is an economical and therefore well established solution on the construc-



Figure 3: CoSFB-building, Maizières-Les-Metz (France)

tion market. However, only by activation of the composite action the full potential of the system can be exploited. Smart application of the existing structural elements leads to major **economical and environmental benefits** without adding complexity to the fabrication or compromising the cost.

Weight reduction, span increase, height reduction, overall increased performance and integrated fire resistance are direct advantages.

These advantages result further in light and spacious structures, flexible use of space, smaller foundations, reduced building height and façade surface, contributing to a reduction of CO₂ emissions and energy efficiency.



Figure 1: Slim-Floor Construction with Cofradal slab

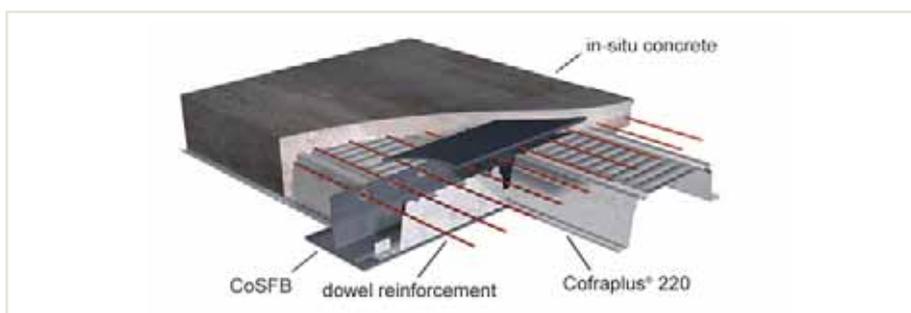


Figure 4: CoSFB with Cofraplus 220®

Additional major improvement of this floor system is brought-in by incorporating ArcelorMittal slab systems – floors made by ArcelorMittal Construction, such as Cofraplus 220 (Figure 4).

Thanks to a **high level of prefabrication** the quality of the floor system is assured, the safety on the building site is increased and the time for the erection of the structure is reduced. ArcelorMittal CoSFB is an ArcelorMittal intensive and flexible solution.

CoSFB-Betondübel

The “CoSFB-Betondübel” is an innovative shear connector to link a hot rolled steel section to

in-situ concrete. These so called “concrete dowels” are defined as drilled holes through the web of the steel section through which standard reinforcement bars are

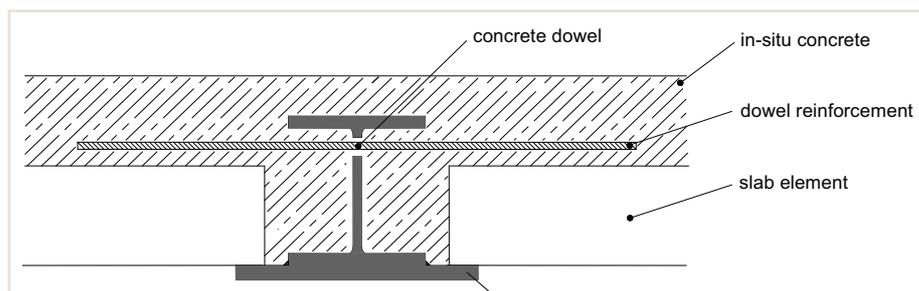


Figure 5: Slim-Floor Beam with concrete dowels, CoSFB

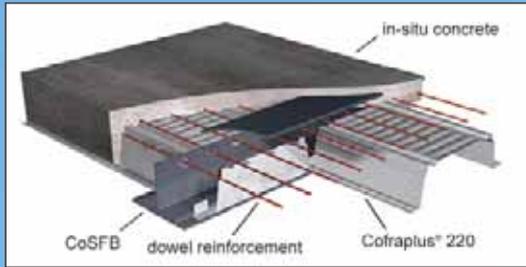
placed in transversal direction to the beam span (Figure 5). While the holes are filled with concrete, the shear connection is activated. Main application is for integrated floor beams – slim-floor construction – which

allows for an optimization of the construction height and an **optimized design**.

Due to the integration of the beam into the slab and the activation of a composite action the beams are fulfilling in most of the cases the requirements of the fire resistance class **without any additional measures**. The concrete dowel technology (CoSFB) is a flexible solution that can be used with any other common floor system allowing for an optimized **tailor-made customer**

solution. Overall this is leading to an optimal use of raw materials and therefore to a sustainable and economic construction.

Composite Slim-Floor Beam - Technical approval Z-26.4-59



Large spans combined with low construction height!

Modern architectural requirements are now realised economically thanks to an innovative technology: Composite Slim-Floor construction using concrete-dowels. Basically, the CoSFB dowel can be flexibly combined with various floor systems (e.g. precast concrete floor systems, Cofraplus 220®). The key benefits include:

- Easy manufacturing and assembling
- High integrated fire resistance
- Material-savings through optimum utilisation of raw materials
- Economic and sustainable construction

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