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5 Ways Heavy Civil Teams Benefit from

4D Digital Twins

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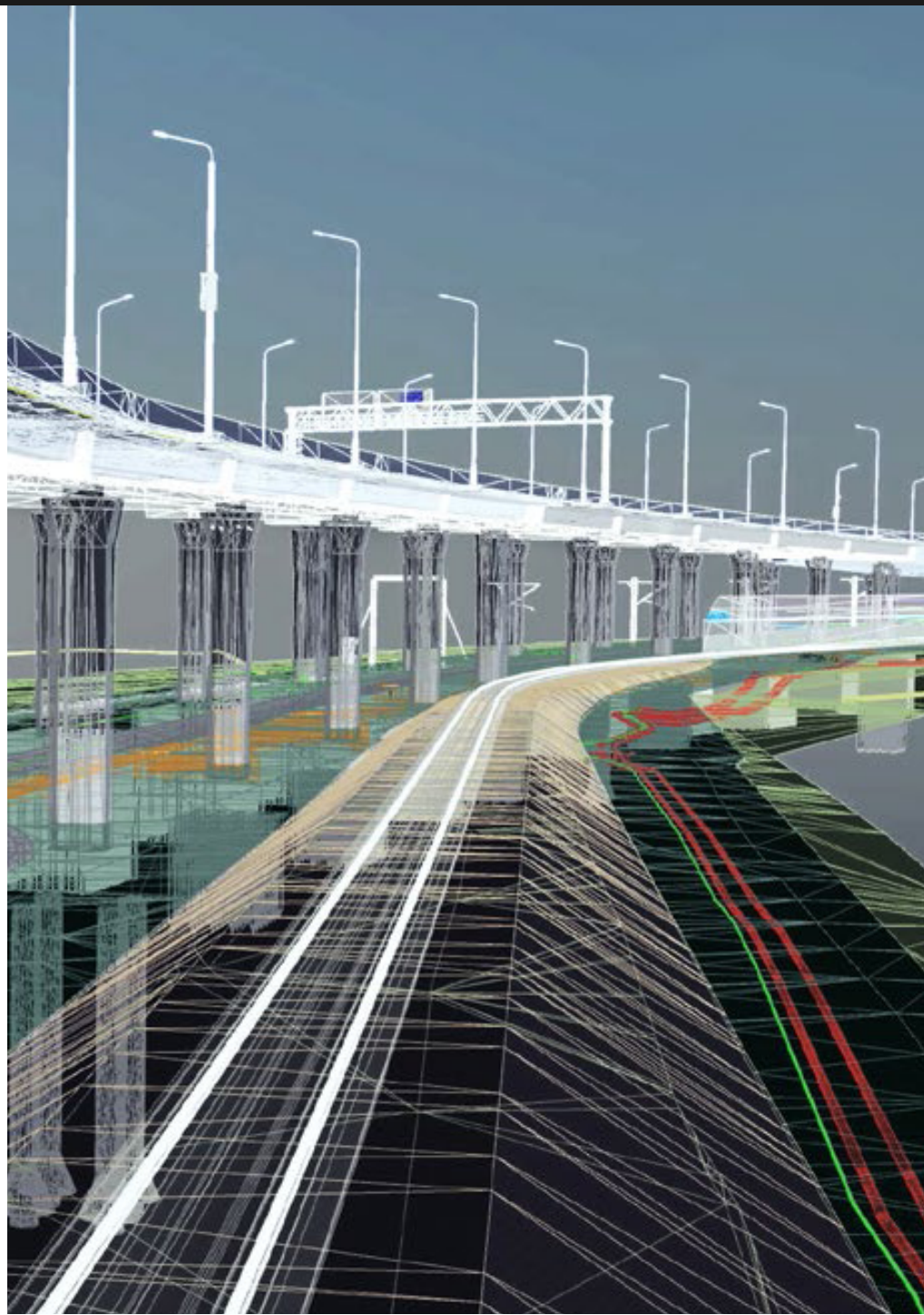


Construction's Digital Revolution Is Here

The construction industry being slow to adopt digital technologies is not new information. Despite employing 7% of the world's working-age population and being one of the world economy's largest sectors[1], it has the second-lowest overall digitization rating, according to McKinsey & Company's MGI Digital Index[2].

However, over the years, more construction firms have recognized the need for digitization and begun to realize the significant benefits that digital workflows can bring. But while 75% of companies that have adopted BIM technology reported positive returns on their investments[3], we are still seeing a slower widespread adoption of BIM or 4D modeling from the heavy civil construction industry.

The good news? There is a proven solution that has revolutionized the civil industry and opened doors to newer and more efficient processes— the 4D construction digital twin.

[1] Reinventing construction through a productivity revolution, McKinsey & Company, 2017.
[2] Digital America: A Tale of the Haves and Have-Mores, McKinsey & Company, 2015.
[3] Imagining construction's digital future, McKinsey & Company, 2016.

Why the 4D Digital Twin Is Game-changing

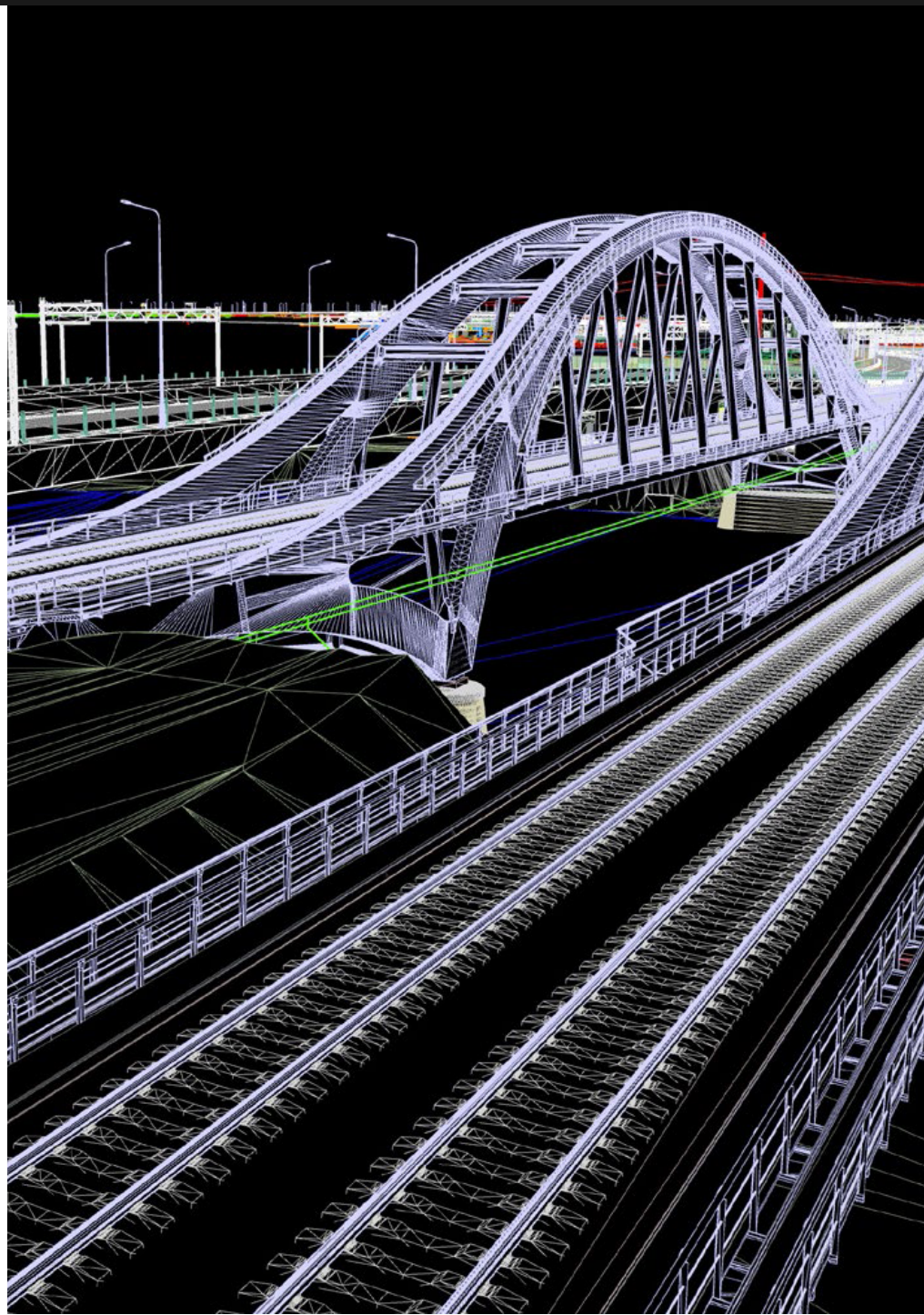
A digital twin is a digital representation of a physical asset, process, or system that enables teams to understand, model, and analyze its performance. A digital twin creates a single view of truth, providing all the data needed to improve performance, predict and prevent unscheduled downtime, lower operating costs, and address any potential safety concerns that may arise throughout the project lifecycle.

A 4D construction model happens when you create a 3D model and add the fourth dimension of time—your project schedule. It lets you analyze and visualize the sequence of events on a timeline and implement it in your model.

A 4D construction digital twin takes that 4D model and includes all the information that allows you to understand the model and its performance. This live, evolving set of data enables teams to exploit the strongest data-driven workflows and optimize performance at every project phase.

By using a 4D construction digital twin, heavy civil teams can secure five key project benefits:

1. Leverage a Single Common Data Environment
2. Split Model into Constructible Components
3. Simulate Construction Sequences Pre-build
4. Streamline Real-time Communication to All Parties
5. Ensure Key Project Outcomes



1

Leverage a Single Common Data Environment

As heavy civil projects continue evolving in size and complexity, it's imperative for teams to nail down the most efficient processes to exchange project data and information. The 4D digital twin assembles and aggregates all data pertinent to a project and can contain information from all stages—including planning, bidding, design, construction, and operations.

Data from multiple sources is stored in the cloud and made available through apps and web browsers, allowing for tasks such as 4D scheduling, simulations, and model-based estimating. Construction teams set themselves up for success by leveraging 4D modeling—one of the most effective ways to implement digital best practices, run tests, and simulate sequences in the model before going on site.

A 4D digital twin allows teams to work around a single source of project truth, ensuring clearer project alignment and better decision-making.

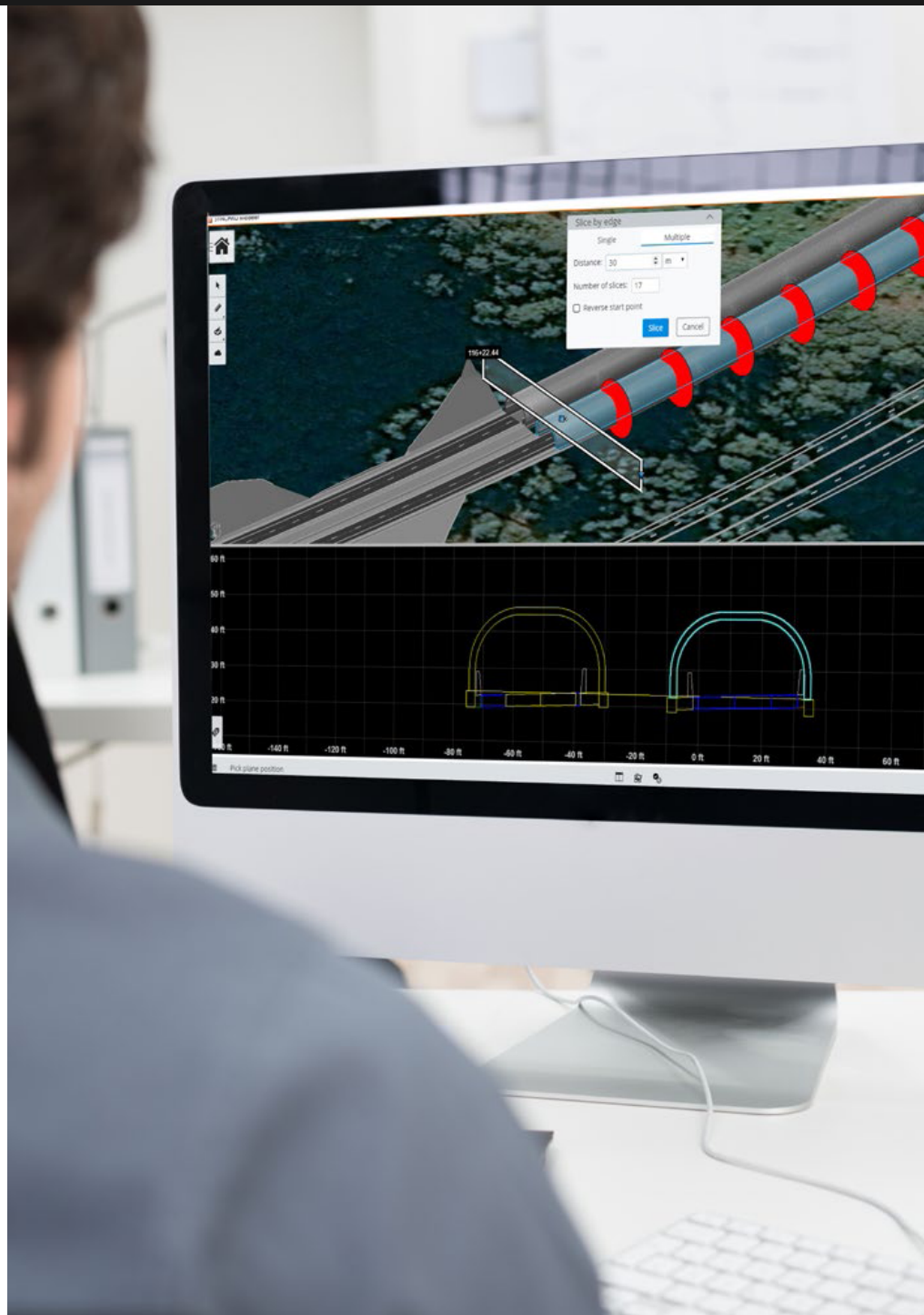
2

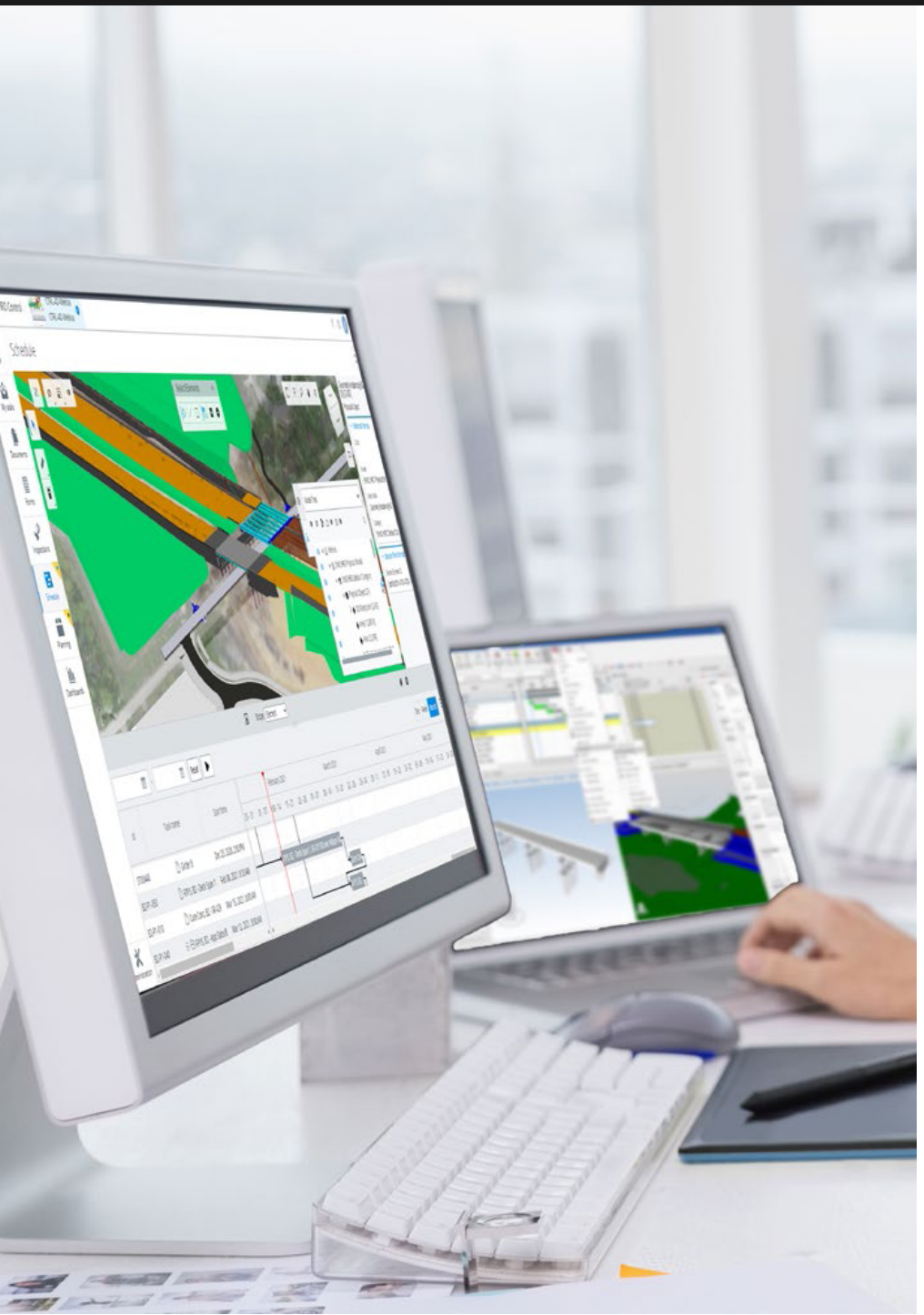
Split Model into Constructible Components

When mapping out a vast heavy civil construction project, it is often difficult to begin the process of estimating quantities, resources, and accurate schedules. This process has historically been manual, which can lead to mistakes in calculations due to the sheer size of the project site and human error. Up until the last few years, there had not been an option for teams to break down a large project and tackle planning in smaller sections.

With 4D digital twins, teams can isolate specific project elements and add construction-focused properties to the model. For example, teams can now locate and track elements more easily with automatic geolocation features, allowing them to pinpoint elements within a map view and connect them to the schedule to better assess project progression over time. Knowing exactly where to flag an issue and who to communicate it to is a game changer.

Teams can also add cost codes and quantity calculations to constructible components, creating faster and more accurate model-based quantity take-offs (QTOs). Tracking actual costs versus cost-loaded schedules allows teams to stay on top of issues in real-time, ensuring that projects stay on track and within budget.





3

Simulate Construction Sequences Pre-build

Unforeseen events during construction projects are inevitable. However, by anticipating issues early in a digital environment, teams can better identify problems in the early stages of projects. It can be the difference between avoiding significant rework and saving large amounts of time and money.

By connecting the digital twin to a project schedule, heavy civil teams can run a simulation of the schedule and visualize the build before it happens out on site.

Analyzing the simulation allows teams to identify pain points and errors, limiting the need to adjust the overall plans in the field. Additionally, leveraging scheduling and simulations can reduce labor cost by 50%, increase field labor productivity by 75%, and reduce overall schedule time by 15%.

4

Streamline Real-time Communication to All Parties

Clear communication is the key to any successful project. However, with its specific characteristics, the construction industry forms a complex communication environment. Maintaining consistent communication between stakeholders and teams, especially on large civil projects that involve multiple players, is challenging to say the least.

4D construction digital twins allow crews to share real-time data to the entire team in an interface that supports workflows in full construction project context. Teams can also benefit from 4D model views in web, mobile, and desktop applications. With constant access to project updates, as well as clear communication throughout the project lifecycle, projects run smoothly, and costly decision delays are minimized. Everyone is aware of important and timely information, allowing for quicker and better data-driven decisions.

5

Ensure Key Project Outcomes

Without proper project documentation and data to reference, analyzing performance, as well as remembering specific issues and how they were addressed, can be nearly impossible—and risky. As guidelines evolve and inspections and requirements become stricter, it is more important than ever to be able to easily reference project information.

By leveraging 4D digital twins, heavy civil construction teams can better anticipate and see through key project outcomes. With comprehensive real-time data sharing throughout the entire project lifecycle, teams can reduce risk and ensure all major milestones are met on time and within budget. Additionally, by keeping the project on schedule, teams save money by avoiding rework or penalties for late projects.

The 4D model ensures teams drive better outcomes by transforming project execution workflows, such as production planning, model-based progress tracking, and project insights taken straight from the live model.

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To deliver successful projects, heavy civil teams should be empowered with the right digital solutions to simplify tasks and meet deadlines and budgets— all while keeping everyone connected and on the same page.

SYNCHRO enables construction teams to work faster, better, and safer.

Curious to learn more about SYNCHRO 4D and the rest of the platform? Speak to one of our SYNCHRO experts to better understand how we can meet your project needs.

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