

A man with a beard and glasses, wearing a black TKE uniform and cap, is walking towards the right. He is holding a black briefcase in his right hand. The background is a blurred office or industrial setting with large windows.

MAX

The game-changing
predictive maintenance
service for elevators

IN A MAX-CONNECTED CITY, ELEVATORS WILL RUN MORE CONSISTENTLY, OFFERING ADDITIONAL AVAILABILITY, MEANING MINIMAL STRESS AND MORE QUALITY TIME.

CONTENTS

05

Keeping people moving

10

MAX features

06

The game-changing solutions

12

Optimized service quality

07

Real-time predictive maintenance

14

The future

08

Maximizing the benefits

15

Smart and innovative products



Keeping people moving in a rapidly urbanizing world.

An urbanized planet.

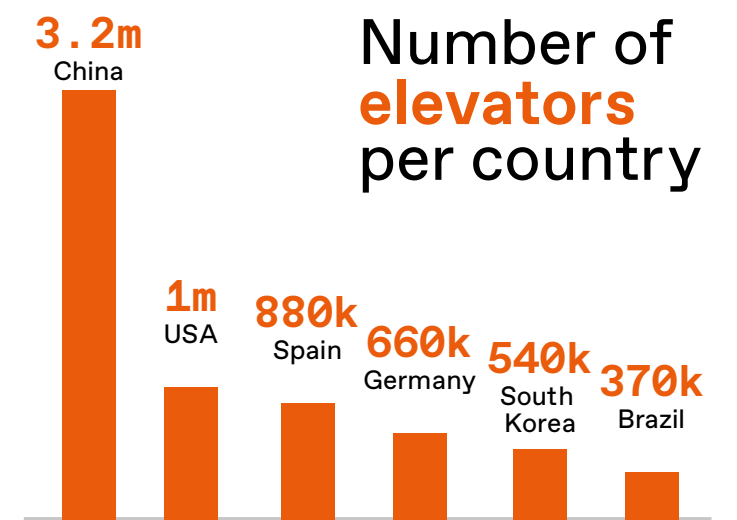
By 2050, 70% of the world's population will live in cities. As our urban populations grow and our cities become denser, they are also getting taller. Since 2000, the number of high-rises (>200 m) has tripled and over 180 buildings currently under construction are more than 250 m tall. All this means that the importance of elevators is also increasing. More than 12 million elevators make seven billion trips and move one billion people daily, making the elevator the world's most widely used (and safest) means of transportation.

70% of the global population will be **living in cities** by **2050**

Efficient mobility is essential.

In fast-paced urban environments, time is of the essence, and efficient mobility is essential. Elevator downtime has a massive impact on this efficiency. In a single year it is estimated that globally elevators are unavailable or out of service for a cumulative total of 190 million hours – a figure so huge it is barely tangible.

Number of elevators per country



Need for improved elevator availability.

Clearly, there is a disconnect between traditional elevator maintenance procedures and the needs of today's urban environment. Although elevator maintenance technology had evolved to usage-based concepts by the 1990s, it is no longer adequate for today's world. Something dramatic is needed to improve elevator availability. That game-changer is MAX.

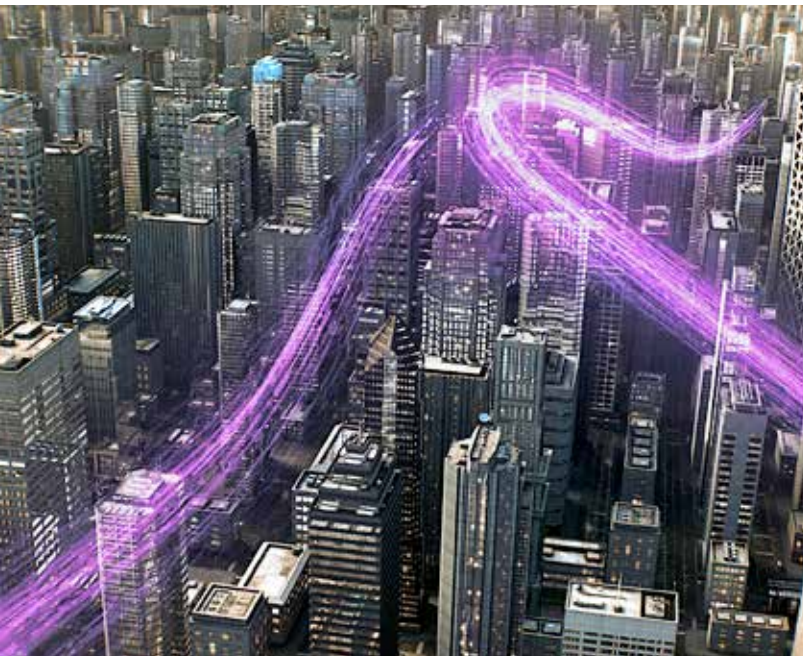
16.6 years Cumulative time wasted by New York City workers **waiting for an elevator** in 2010

MAX: The game-changing solution to maximize elevator availability.

Applying the Internet of Things (IoT) to elevator maintenance, experts from TK Elevator and Microsoft spent two years developing MAX, the industry's first real-time, cloud-based predictive maintenance solution. MAX leverages the power of Microsoft Azure, a cloud platform developed to advance IoT, in order to create a truly game-changing predictive maintenance service with the power to maximize elevator uptime.

Smart technology to the rescue.

In recent years, the massive advances in smartphone and mobile Internet technology have revolutionized the way we live our lives. Now, IoT is giving everyday objects network connectivity, allowing them to send and receive data. By the end of the decade, as many as 50 billion machines (including computers and mobile devices) will be connected to the Internet, and IoT communication between these portals is already well underway. In 2013, TK Elevator and Microsoft realized the game-changing potential of applying IoT to solve urban mobility challenges. Although the technology for data-driven maintenance had existed for more than a decade, it was cost-prohibitive. But now, ultra-fast, low-cost computing and data storage cost a fraction of what they did a few years ago, and have made the Big Data required for data-driven elevator maintenance commercially feasible.



12 million elevators **in the world** today

Over **50 billion** machines connected to the internet



Real time predictive maintenance – an industry-first from TKE.

MAX in action.

This is how MAX works in practice:



Data collected

1

Machine data, such as door movements, trips, power-ups, car calls, error codes, etc., is collected from MAX-connected elevators worldwide.

Precise diagnoses

2

This data is sent to the cloud where unique algorithms analyze it for patterns and compute the equipment's operation and the remaining lifetime of components.

Predictive intervention

3

Precise and predictive diagnostics are delivered to the technician in real time, indicating where intervention is required.

Scaling new heights in elevator maintenance.

MAX will take elevator availability, reliability and efficiency to new heights. By analyzing data from all MAX-connected elevators worldwide, MAX's machine-learning capability converts every present-day issue into meaningful data in order to deliver a fully predictive and preventive maintenance service for elevators as well as for escalators.

Maximizing the benefits – for elevator users, owners and operators.

The combination of cloud technology, Big Data and machine learning makes MAX an invaluable asset for building owners and custodians. And the benefits MAX brings get bigger and better over time.



Increased uptime.
MAX increases overall elevator availability, serving as an unparalleled means of improving building efficiency.

Number
of trips
elevators make
every day

7 billion

MAX 
will **reduce** out-of-service elevators **by half**



Prolonged elevator lifetime.
An enhanced maintenance service supported by MAX will ensure optimized maintenance for all elevator components, thus prolonging your elevator's overall lifetime.



Faster service.
Precise fault diagnoses and possible solutions sent to the technician in real time ensure that a solution is found quickly and service disruption times are minimized or even eliminated.



Enhanced safety and reliability.
Elevator safety and reliability are further improved as any anomalies are immediately reported to a technician – and when MAX is in full predictive mode, will be reported even before they occur.

All-round advantages.

The benefits of maximizing elevator uptime will be felt not just by users through less time wasted and businesses through productivity gains, but also by building owners and custodians. After all, state-of-the-art, MAX-maintained elevators where downtime has been reduced by half add to the appeal of any building.

Better capacity for planning.
Moving from reactive troubleshooting to proactively preventing failures, MAX provides advance information about the wear and tear of elevator components, allowing you to anticipate and plan for future costs and schedule disruptions.



More transparency.
MAX gives you the benefit of data-driven maintenance service based on clear and transparent data and hard facts. Real-time information about your elevator's operations, performance and service history are readily available.



MAX features.



Multiple-year capital expenditure planner:

The unique algorithms MAX uses predict the wear and tear of elevator components. Hard facts on required repairs or replacements that are readily at hand can help you to plan your budgets well in advance, and are especially useful in planning the replacement of expensive components, such as ropes or doors.



24/7 availability of data:

Clear and transparent elevator information, including elevators in service and their availability levels, are always at hand. MAX also records service data, such as the number of maintenance visits and dates of visits.

Callback patterns:

MAX recognizes patterns between callbacks through continuous data analysis, enabling proactive contact with the customers to resolve the problem.



Service button:

The technician activates this digital button so that you can see in real time that your service request was answered and your elevator is being serviced.

Back-in-service signal:

The technician activates this signal to inform you that your elevator is available again.

Counters for trips and door movements:

How many trips has an elevator made? How many door movements have there been? Counters that clearly record this information can help customers and technicians see where and why any overuse or wear and tear occurs.

Optimized service quality.

MAX marks a game-changing moment in the relationship between elevator service providers and customers, transforming a previously reactive service into a more positive, proactive approach.

A good service gets even better.

With this digital-age partner at their side, TK Elevator's global team of 24,000+ highly trained service engineers will be able to offer an optimized service to minimize elevator downtime and related stress.

Maximum support.

This data-driven solution enhances the expertise of TK Elevator's service technicians. By supporting their technical skills and knowledge with hard facts and machine-learning power, MAX gives them more time to meaningfully interact with customers and improve the quality of each maintenance visit.

24,000+  TK Elevator **global service engineers** who will use **MAX**



The future is now: TKE– a MAX step ahead.

In short years, we've become one of the world's leading elevator companies with unique engineering capabilities, offering next-generation solutions like MULTI, the rope-less elevator, ACCEL, an accelerated people mover, and MAX, a cloud-based predictive maintenance service. Whether building a new state-of-the-art system or optimizing and modernizing existing ones, our solutions deliver crucial energy and time efficiencies, helping to address the challenges of urbanization and transform cities into the best places to live.



Sales of
€8 billion

50,000+
employees

A trusted partner

We support our customers throughout their project lifecycle, from the design to the end-of-life phase. Every step of the way, we strive to fully understand their needs and consistently deliver the safest, highest quality passenger transportation solutions, maintenance and modernization packages.

Through our internal technical support function, ITS (International Technical Services), TKE trains its service technicians in a multibrand portfolio, enabling them to successfully service more than 1.2 million units under maintenance.

TK Elevator

With customers in over 100 countries served by 50,000 employees, TK Elevator achieved sales of around €8 billion in the fiscal year 2019/2020. Over 1,000 locations around the world provide an extensive network that guarantees closeness to customers. Over the past decades, TK Elevator has established itself as one of the world's leading elevator companies and became independent since its sale by thyssenkrupp AG in August 2020. The company's most important business line is the service business represented by over 24,000 service technicians. The product portfolio covers commodity elevators for residential and commercial buildings to cutting-edge, highly customized solutions for state-of-the-art skyscrapers. In addition, it also consists of escalators and moving walks, passenger boarding bridges, stair and platform lifts. Integrated cloud-based service solutions, such as the MAX platform, are gaining in importance. With these digital offerings, there are no limits to urban mobility anymore.

Find out more: www.tkelevator.com

TKE MOVE
BEYOND

We provide smart and innovative products for a wide variety of applications.



Mercedes Benz



One World Trade Center



Makkah Clock Tower / Source © SL Rasch



thyssenkrupp Quartier



WWW.TKELEVATOR.COM