ENGINEERING AND BRIDGE EXCURSION

CHINA 2019

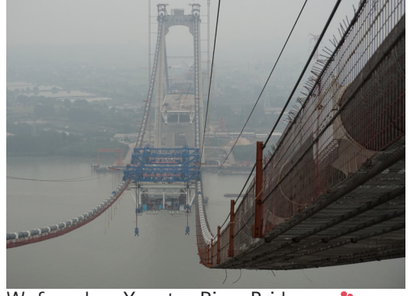
中国

Leibniz Universität Hannover

Glass Bridge
Zhangjiajie National Park

Three Gorges Dam
Province Hubei

Yellow Crane Tower
Wuhan



Wufengshan Yangtze River Bridge
Zhenjiang

Hutong Yangtze River Bridge
Nantong

Shanghai

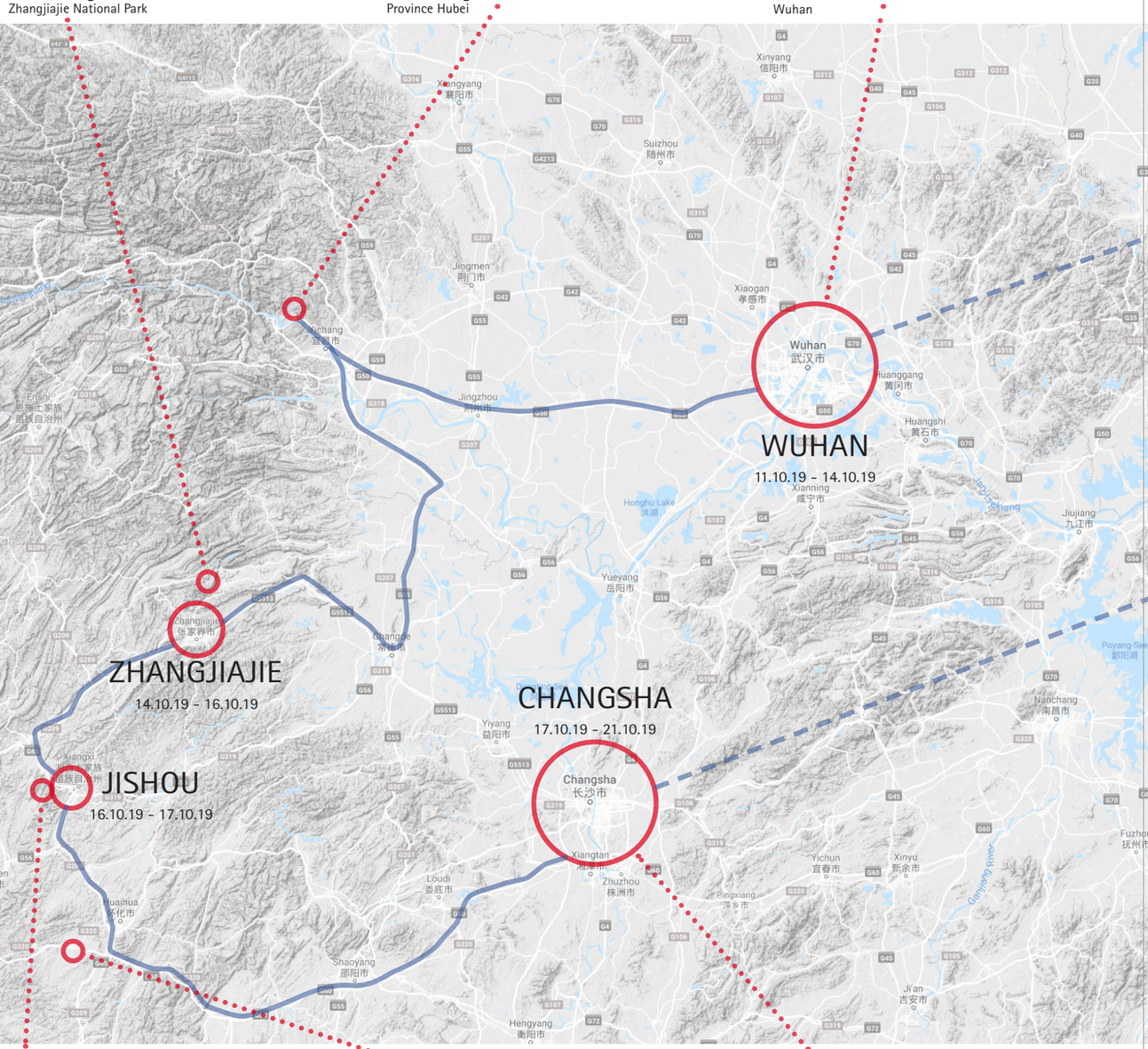
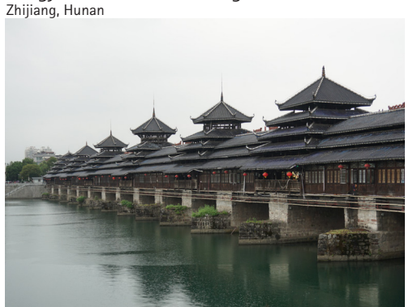


Image source: google.de/maps

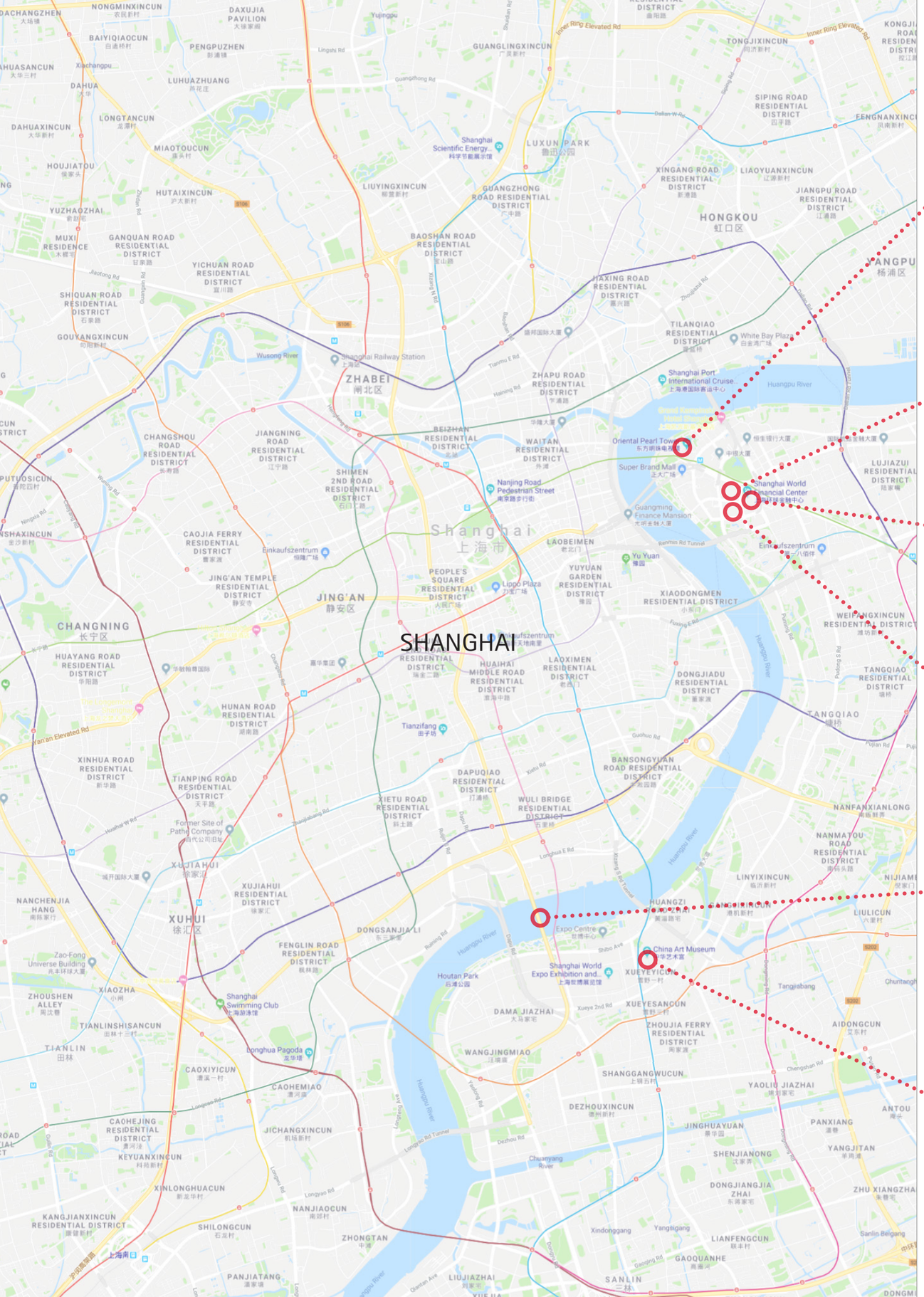
Aizhai Bridge
Jishou

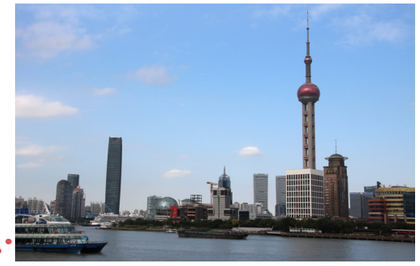
Longjin Wind & Rain Bridge
Zhijiang, Hunan



Statue of Mao Zedong
Changsha

THE ROUTE





Oriental Pearl Tower

Image source: orangesmile.com

Jin Mao Tower

World Financial Center

Image Source: wikipedia.org
Author: Yhz1221

Shanghai Tower

Lupu Bridge

Chinese Pavilion (Expo Park)

DAYS 1 - 4

SHANGHAI

07 - 10 OCTOBER 2019

DAY 1+2 - SHANGHAI

Monday, 07 October 2019
Tuesday, 08 October 2019

Hurry up, the subway in Shanghai doesn't wait long!

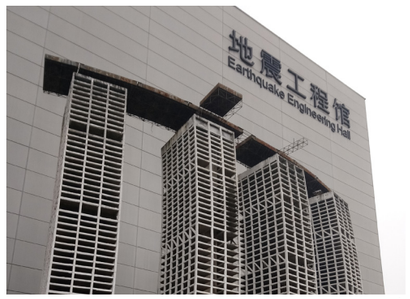
a

Our journey through China started on 7th October 2019 when we landed at Shanghai Pudong International Airport. Despite the joy of having safe ground under our feet again, our good mood was somehow discounted. The 3D printing of our bridge, with which we wanted to take part in a competition at Central South University in Changsha, had been unfortunately not well treated by Lufthansa on arrival as we hoped.

Nevertheless, we exhausted ourselves from the long flight on our way to the metropolis of Shanghai in a Transrapid, which could bring us to the accommodation in the shortest possible time. When we were looking out of the window, the question arose for the first time: Is the cloudy air due to the fog or is it due to the smog? We were also able to collect the first impressions of the Chinese bridge structures directly, single-span beams lined up with single-span beams, although these were not half as impressive as the ones we later viewed.

Afterwards, we transfered to Shanghai metro. However, due to the punctuality of Chinese metro trains, which always arrive and leave on time and leave few time to keep doors open for stragglers, we lost three of our students in a station. Then they had to take the next train to keep up with us. During that time, none of them could connect with us, as they didn't have any internet in China at all. Despite this minor incident, we all still arrived at the hostel. There, the suitcases were quickly brought to the rooms, and then the growling stomachs immediately led us to a restaurant near downtown Shanghai. We were not only impressed by the food itself but also by the brightly illuminated high-rise buildings on our way there for the first time. Conversely, the owner and workers of the restaurant were probably also impressed by our talent for large amounts of food.

On the second day in China, we started very early at 8 a.m. with a trip to the Tongjie University, where not only interesting lectures about the research of the university awaited us but also a tour of their laboratories. First of all, however, we confirmed one of the German clichés by arriving at the university 50 minutes earlier with great enthusiasm.
After some interesting lectures, we had a very delicious surprise lunch, which was kindly prepared by the bridge department of the university. Afterwards, we were taken to



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a Nanjing Lu
b Earthquake Engineering Hall
c Test wall of the Earthquake Engineering Hall
d Yu Yuan Garden District
e Hu Xin Ting Teahouse
f Group picture at Tongji University

d

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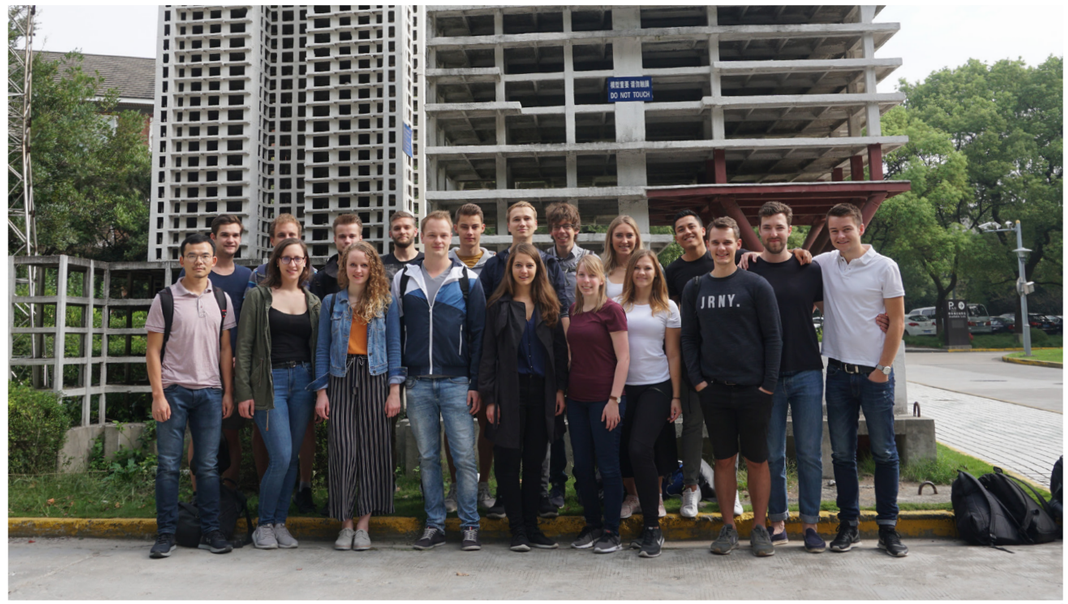
a test hall, more precisely, to the "Earthquake Engineering Hall", where six separate shake tables and a lot more technologies are used to examine structures for the earthquake safety. This also showed us some big differences of doing researches in China compared to Germany: we rely on precise simulations based on specific assumptions together with small scale tests, while in China they seem to prefer to depend on comprehensive large-scale tests results.

Our tour at Tongjie University ended earlier than we expected. Afterwards, we decided to take a trip to the city center of Shanghai. There we not only enjoyed the first glimpse of the skyline of Shanghai, but also strolled along the Yu Yuan Garden District, where part of the group unfortunately fell straight into the first tourist trap and bought what was probably the most expensive tea of their life.

We ended this successful and joyfull first day in a traditional Chinese restaurant. In the evening, we enjoyed our time on the terrace of the hostel with beer and card games.

Author: Marie Pudewills



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DAY 3 - SHANGHAI

Wednesday, 09 October 2019

The biggest attraction at the water front - us!

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Our third day in Shanghai - in the meantime we had not only gained experience in using the metro (rush hour was no longer a problem), but also naturally got us our baozi (filled steamed dumplings) or other Chinese delicacies for breakfast from the food stall at the next street corner. Thanks to the Chinese counting system, with which one can count to ten with one hand, we were able to place our orders and learn the associated prices despite the language barrier.

But despite all the routine, this was a day full of wonderful things as it was finally the day of sightseeing in Shanghai! Started from the second largest arch bridge in the world, the Lupu Bridge, we went on to the Expo Park. As in Hanover, this area looked somehow deserted. A stadium and the main axis of the former Expo still exist. The lack of people did not bother us, because of that we were able to marvel at the impressive steel, glass and membrane structures. The Chinese pavilion at the time was modeled as a pagoda and could be seen from a far distance due to its outstanding size and the use of the eye –catching national red color. Today this building is used as the Chinese Art Museum. In this museum, we enjoyed a vast amount of Chinese art works and learned that Chinese history had produced a wide variety of artistic styles, which are far beyond what we know from the decorations of Chinese restaurants in Germany.

b

The next item on the program was the highly anticipated Shanghai skyline. From the other side of the river at the "The Bund" we had an excellent overview and informed ourselves about the Oriental Pearl Tower, the Jin Mao Tower and the Shanghai World Financial Center. At the time of their constructions, these buildings were all among the tallest and most technically sophisticated buildings in the world. Subsequently, our path led us to the Shanghai Tower, currently the second tallest building in the world with a height of 632 m right after the Burj Khalifa, which is 828 m tall. After learning more about the technical details on sustainability, wind load reduction, earthquake safety and building information modeling, we went "all the way up" in the world-record elevator in the building. The sunset was very incredible and the night view of Shanghai were full of dynamic neon signs. This has been one of our most impressive experiences in China. After a typical Chinese hot-pot dinner, we went back to the hostel, where some ended the evening relaxed with a beer and getting to know each other in the lobby, while others got in touch with the famous Shanghai nightlife.

Author: Linda Bücking

a Shanghai Skyline
b Chinese tourist photographing us
c Lupu Bridge
d Group picture at the Lupu Bridge

Image source: wikipedia.org; Author: Dingyuang

c

卢浦大桥

LUPU-BRIDGE

Arch bridge
Max. span: 550 m
Rise of the arch: 100 m
Clear Height: 50 m
Opening: 28 June 2003

With a span length of 550 m, the Lupu Bridge was the longest arch bridge in the world when it was opened in 2003. This was exceeded by the Chaotianmen-Yangtze Bridge in Chongqing, which is only 2 m longer, in 2008. The name Lupu Bridge is an abbreviation of the Luwan and Pudong districts, which are connected by this bridge crossing the Huangpu River.

The Lupu Bridge is a steel arch bridge, the archs are made of two prefabricated welded steel hollow box segments. The height of these box segments vary from 9 m at the foot of the arch to 6 m at the apex of the arch. In addition, the arches are inclined vertically to each other with 5°, thus, the 27 crossbars in the area of the apex become shorter. Due to the poor condition of the ground soil, steel cables were tensioned through the main girders to balance the horizontal forces of the arch structure by closing the flow of the forces. The girders are tied to the arch construction.

The Planning of the Lupu Bridge began in August 1999. The construction of the pillars on the bank side began in October 2000. The arches were constructed by applying the cantilever construction method. For this purpose, steel auxiliary pylons were first erected above the pillars, on which the arches could be hung back during the construction. Only when the arches were closed on October 7th, 2002, the force flow of the whole bridge was closed and the auxiliary pylons could be dismantled again. The bridge was opened to traffic on June 28th, 2003.

Since April 28th, 2006 there has been a viewing platform on the highest point of the bridge. The paltform provides a good overview of Shanghai and can be climbed from the northeast arch.

Author: Wiebke Vogelsang

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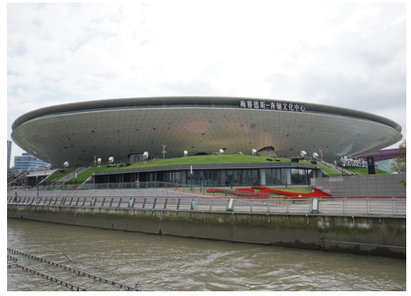
上海世博园

EXPO PARK SHANGHAI

International Exhibition Expo 2010
Motto: *„Better City - Better Life"*
Area: 5.28 km²
Participants: 242
Nations: 192



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242 exhibitors participated in the Shanghai Expo 2010. 192 nations and 50 international organizations have exhibited within an exhibition area of 528 hectares. It was the largest expo up to then with 73 million visitors. Since there were many old industrial buildings and traditional residential areas on the Expo site, they needed to be demolished. As e result, 18,000 families had to be relocated.

The most impressive buildings include the Expo Axis and the China Pavilion:

EXPO AXIS:

The Expo Axis is a 1000 m long central boulevard that connects the main entrances to the Expo, the China Pavilion, the themed pavilions, the Expo Center and the grounds. With an area of 65,000 m², the Expo axis has the world's largest membrane roof construction, which is supported by 19 interior and 31 exterior masts as well as six funnel-shaped frame shells made of steel and glass. The funnels have a height of 45 m and a radius of 80 m. The Expo Axis is 110 m wide and has several levels.

CHINESE PAVILION:

The Chinese pavilion is a complex two-part structure, consisting of a flat base structure and a towering main building with a sweeping pagoda shape. With a height of 63 m, it towered three times over all other country pavilions and has five levels. The facade of the main building shines in seven different types of Gugong reds. This red was previously reserved for buildings in the Forbidden City in Beijing. From the outside it can be seen that Dougong-connections were used. However, these serve only for asthetic values but no supporting functions.

Author: Eike Schenk

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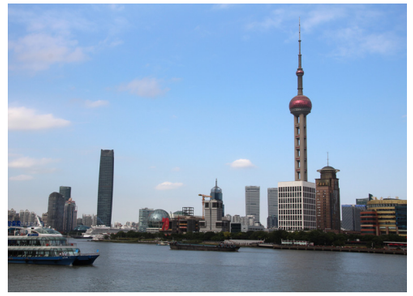
a Mercedes-Benz-Arena
b Expo Axis
c Chinese Pavilion
d Oriental Pearl Tower
e Oriental Pearl Tower
f Oriental Pearl Tower at night



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上海东方明珠

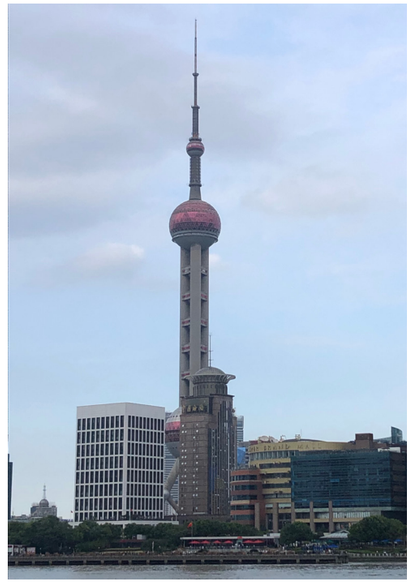
ORIENTAL PEARL TOWER

Television tower
Height: 468 m
Construction Time: 3 Years
Opening: 01 January 1995

The construction time of this 468 m high radio and television tower was just over three years from July 30th, 1991 to October 1st, 1994. The Oriental Pearl Tower in the Pudong district was opened on January 1st, 1995 and had been the tallest building in China until 2007. Even if the tower was surpassed in terms of height by other bulidings such as the Shanghai World Financial Center, the tower still impresses with its extraordinary architectural appearance. The structure was designed by the architects Jia Huan Cheng and Shanghai Modern Architecture Design Co. Ltd. The construction costs approximately 850 million yuan in total (110 million euros). The tower consists of eleven balls in different sizes. The largest ball is located at a height of 68 m to 118 m and is held by three outward-facing concrete supports, which in turn are anchored underground. The two largest steel balls with a diameter of 50 m and 45 m are connected to each other with three concrete columns, of which the diameter is 7 m. Between the concrete columns there are five more balls with a diameter of 14 m. A hotel with 20 rooms is arranged in these balls. A column (with a height of 295 m) rises above the 45 m diameter ball and carries the top ball, which is at a height of 335 to 349 m. The antenna is attached above this ball. The maximum design structural wind load is 600 km/h.

The television tower is able to transmit signals for over 30 radios and television stations. The tower is illuminated at night, which is a highlight of the famous skyline of Shanghai. The National History Museum is located in the base of the television tower. The Oriental Pearl Tower has several bars, conference rooms, shopping centers, several viewing platforms and even an indoor roller coaster. The structure reminds some people of a utopian space station, others claim that the design is based on a Chinese poem by Bai Juyi.

Author: Sandra Jürgens



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金茂大厦

JIN MAO TOWER

Skyscraper
Height: 420.5 m
Construction Time: 4 Years
Opening: 28 August 1998

The Jin Mao Tower is also part of the famous Shanghai skyline. Although it was the tallest building in China with a height of 420.5 m after four years construction when it was inaugurated on August 28th, 1998. It is now esceeded by its neighboring towers, the Shanghai World Financial Center and the Shanghai Tower. The design as well as the dimensioning for the tower were carried out by Skimore, Owings and Merrill.

The basic idea was particularly to use the number eight, which is considered as a symbol of prosperity in China. For this reason, the entire building has 88 floors. It is divided into 16 segments, each segemnent is 1/8 smaller than the one below. The shape should be reminiscent of a traditional Chinese pagoda or bamboo.

The Jin Mao Tower was gounded on 1062 steel pillars, which were necessary due to the poorly capacity of the soil near the river. Another challenge was the large construction height and the associated susceptibility to vibrations. This was solved by the shock-absorbing joints in the steel structure and a swimming pool, which locates on the 57th floor and has additional passive damping effect. The building can thus withstand wind speeds of up to 200 km/h, a 7th grade earthquake based on the Richter magnitude scale and a maximum deflection of the building tip up to 75 cm.

While the lower 50 floors serve either as office space or as restaurants, shops and clubs, the top 38 floors are part of the 5-star Grand Hyatt Hotel, which has a world-record atrium extending from the 53rd to the 87th with a connection to the basement of the building, it has, thus, the longest laundry shaft in the world. There is also an observation deck on the 88th floor, which can be reached by an elevator within 46 seconds. In addition, the Jin Mao Tower has a skywalk, which is a 1.20 m wide glass projection without railings. On this skywalk, you can look downwards from that height, secured only with a belt.

Author: Marie Pudewills

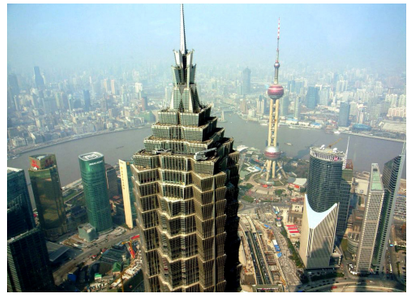

Image source: orangesmile.com a

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a Jin Mao Tower
b Jin Mao Tower
c World Financial Center
d Group picture in front of the Shanghai Skyline

c

上海环球金融中心

WORLD FINANCIAL CENTER

Skyscraper
Height: 492 m
Construction Time: 11 Years
Opening: August 2008

With a height of 492 m, the Shanghai World Financial Center is currently the second tallest building in Shanghai and ranks as the 11th tallest building in the world. The skyscraper has 101 floors above ground, in addition to office space, it also contains a hotel, various shops, restaurants and a museum. Parking spaces are located on the three basement floors.
The developer of this building is Minoru Mori, the former president and CEO of Mori Building Co. Ltd, which is a large Japanese real estate developer. The construction project was financed by more than 36 international companies, mainly Japanese banks and insurance companies. The total cost of construction is about 764 million euros.
The skyscraper is a prestige property, which is supposed to symbolize the financial strength of China. The American architecture firm Kohn Pedersen Fox (KPF) is responsible for the design. The most striking feature of the building is the approx. 50 m wide, trapezoidal opening in the top area of the skyscraper. This opening, which earned the building the nickname "bottle opener", was originally designed as a circular opening. However, due to complaints that the circular shape was too reminiscent of the Japanese flag pattern, the design was altered.

The start of the construction work was in 1997. Due to some interruptions of the financial crisis in East Asia and the economic crisis in Japan as well as several rescheduling, the construction time for the financial center lasted almost 11 years. The World Financial Center was finally opened in August 2008.

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The building was built on a combined pile and slab foundation. The supporting structure of the high-rise building consists of a concrete core in the middle and four mega supports at the corners of the building. These supports are connected to each other by half-timber structures and stiffening elements with concrete cores. The 30 m × 30 m massive reinforced concrete core extends from the underground parking garage to the 94th floor. The majority of the floors above were built as steel construction in order to save weight as well as to be built more easily and cost-effectively. The mega columns are composite columns that extend from the foundation to the 101st floor. The facade is made of laminated safety glass as a curtain wall.

On the 90th floor the building exsits a damping device. It is based on the principle of the spring-mass system. The intension is to reduce the fluctuations in the building under wind influences by around 40%. In this context, extensive tests were carried out on a scaled model in a wind tunnel. With regards to earthquakes, the building was designed in accordance with Japanese earthquake protection regulations. Earthquake tests were carried out on a 1:50 scale model on a vibrating table.

Author: Lisa Tielemann

a World Financial Center
b Jin Mao Tower, World Financial Center & Shanghai Tower
c Jin Mao Tower, World Financial Center & Shanghai Tower
d Shanghai Tower
e Shanghai Skyline

c

d

上海中心大厦
SHANGHAI TOWER

Skyscraper, second tallest building in the world
Height: 632 m
Construction Time: 7 Years
Opening: Summer 2015

The Shanghai Tower is located in the financial district of Pudong. As the tallest building in China, it overlooks the Shanghai skyline. With a building height of 632 m, the Shanghai Tower is currently the second tallest building in the world just after the Burji Khalifa (828 m) in Dubai.

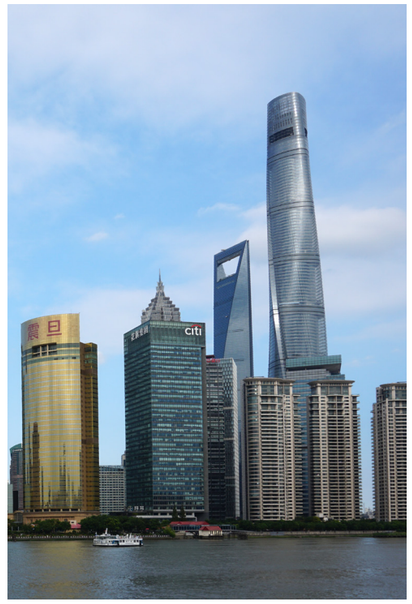
The gross floor area is 420,000 m^2, of which 380,000 m^2 can be actually used. Among the 128th floors the tower holds space for a hotel, offices, exhibition rooms, a viewing platform and a shopping center. There is a total of 106 elevators in the building, among these is the fastest elevator in the world (max. 20 m / s), which takes visitors to the viewing platform on the 121st floor, the highest viewing platform in a building worldwide.

Preparations for the site began in 2008. The building was completed in summer 2015. The construction costs were estimated at around 2.16 billion euros. The foundation was constructed with over 80 m deep bored piles and a round reinforced concrete foundation slab with a diameter of 121 m and a thickness of 6 m. The foundation slab was casted within only 60 hours. The tower consists of nine cylindrical, stacked reinforced concrete segments, which are covered by a glass facade. The concrete was casted with a concrete pump to a building height of 580 m.

On the 125th and 126th floor is a 1,000 t flywheel, which is supported by twelve steel cables. Below this mass, copper plates have been attached to aluminum profiles on the reinforced concrete ceiling. Huge permanent magnets on the flywheel induce eddy currents in the copper plates and generate an opposing magnetic field that slows down the flywheel under wind and earthquake excitations without contact.

The building has an inner and an outer facade construction, which reduces heat losses in the building. The outer glass facade is rotated by 120 °, which reduces the wind load on the building by 24%. By twisting the facade, rainwater can also be collected and the air conditioning and heating systems can be refilled. The planners and the city of Shanghai aimed to design a sustainable, energy-efficient building.

Author: Till Heße



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Zhenjiang

Image source: wikipedia.org
Author: Tiger@ 西北

Wufengshan Yangtze River Bridge

Hutong Yangtze River Bridge

DAYS 4 - 5

SHANGHAI - ZHENJIANG - WUHAN

10 - 11 OCTOBER 2019

DAY 4 - CONSTRUCTION SITE

Thursday, 10 October 2019
Once in a lifetime!

The fourth day of our trip was all about saying goodbyes, because our last night in Shanghai was behind us. The city said goodbye to us with beautiful sunshine and a blue skiy knowing that we would return to this exciting metropolis in the end of our trip soon. We held very high anticipations for the upcoming consruction site visits.

Soon after the suitcases were packed, the safety shoes were stowed away and the last baozi on the roof terrace of the hostel were consumed, we were picked up at the hostel by a bus at 8 am. Since the previous night had been quite short for some of us, the following three-hour bus ride was used for an extensive morning nap.

The first stop of the day was around 11 am at the Hutong Yangtze River Bridge in Nantong, which is in the north to Shanghai. This almost completed construction, of which both an inclined cable bridge and an arch bridge are integrated, fascinated us from a very far distance due to its incredible mega dimension. First we watched a short film about the building in a meeting room close to the construction site. We were particularly impressed by the detailed simulations and visualizations of the construction process. After a short drive to the nearest pylon of the cable-stayed bridge, we went to the lower level of this bridge with a construction site elevator before we were able to explore the upper level of the bridge. Here, especially when it came to the fear of heights, a lot was demanded from us. We could neither trust the cable ties as much as the the Chinese workers could, nor trust the completely loose scaffolding floors at great heights. However, after these feelings were overcome, the fascination for this building prevailed.


a

After a delicious lunch at the construction site, the bus continued to drive towards Zhenjiang at 2 pm. The precision of every pothole our bus encountered on the road during this journey was very impressive.

We reached the Wufengshan Yangtze River Bridge, which is a suspension bridge still under construction, near Zhenjiang around 4 pm. We also had the opportunity to look over this bridge from above – precisely from the very top. With a construction site elevator that wobbled properly, it took us about eight minutes to get to the top of the pylon at a height of about 200 m. However, Dean had a queasy feeling when looking down. Nevertheless, the view from above and the view of the huge construction site were breathtaking, even though the view was a bit cloudy because of the weather.


b


c

a Conference Room
b Hutong Yangtze River Bridge (construcion site)
c Hutong Yangtze River Bridge (construcion site)
d Wufengshan Yangtze River Bridge (construcion site)
e Wufengshan Yangtze River Bridge (construcion site)
f Group picture on the Hutong Yangtze River Bridge


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After everyone had solid ground under their feet again around 6 pm, a delicious dinner in the nearby container village, which had been specially built for the workers involved in the construction of the bridge, was prepared for us. Afterwards we took the bus to the hotel in Zhenjiang, which we reached around 8 pm. The majority of our group fell into bed, exhausted from this eventful day and we quickly fell asleep with the feeling that we had great and definitely unique experiences.

Author: Lisa Tielemann


f

沪通长江大桥

HUTONG YANGTZE RIVER BRIDGE

Cable-stayed bridge
(under construction)
Total length: 11,076 m
Max. span: 1092 m
Height pylon: 325 m
Estimated completion
date: 2020

The Hutong Yangtze River Bridge is a bridge chain, which is still under construction, with a total length of around 11 km. In addition to the approach bridges, the structure is dominated primarily by the southern cable-stayed bridge and the northern steel arch bridge. With a main span of 1,092 m, the cable-stayed bridge is not only the longest in the world of its kind but also has the highest pylons in the world of about 325 m.

The pylons are based in huge water basin foundations. Around 147,000 m^3 of concrete were needed to construct a pylon. Due to the difficult weather conditions on site, a self-climbing formwork system was chosen for the construction of the pylons, which ensures a smooth process regardless of the extreme weather conditions. Geometric changes in the pylon cross section can thus be easily adapted. The system has a hydraulic unit and thus enables the simultaneous climbing of 30 self-climbing units.

In addition to the cable-stayed bridge in the south, which crosses the Yangtze River, a steel arch bridge spans the canal of the Tiansheng Harbor in the north. It has a flexible arch and a rigid support with a span length of 336 m. Around 32,400 t of steel were used for the steel arch. The roadway is divided into two levels. A four-track railway line runs inside the truss. A six-lane highway is planned above the girder.

The construction of the bridge started in June 2016. With the completion of the Hutong Yangtze River Bridge, the travelling time between Shanghai and Nantong is to be reduced from two hours to just one hour.

Author: Wiebke Vogelsang

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a Hutong Yangtze River Bridge (construction site)
b Pylon of the Hutong Yangtze River Bridge
c Truss of the Hutong Yangtze River Bridge
d Wufengshan Yangtze River Bridge (construction site)
e Pylon of the Wufengshan Yangtze River Bridge

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五峰山长江大桥

WUFENGSHAN YANGTZE RIVER BRIDGE

Suspension Bridge
(under construction)
Total length: 6.4 km
Main span: 1092 m
Height pylon: 202 m
Estimated completion
date: 2020

The Wufengshan Yangtze River Bridge will be the first (still under construction) high-speed railway suspension bridge in the world, when it is completed. The bridge has a total length of 6.4 km and a main span of 1,092 m. It is considered one of the key projects for the expansion of the Lianzhen railway line. The construction reduces the travel time between Lianyungang and Shanghai from eleven to three hours. The bridge was designed by the design master Mr. Xu Gongyi, whom we got to know during our visit to the engineering office BRDI.

On the construction site, we had the opportunity to walk on the 202 m high pylon after an eight-minute elevator trip and to get a special view of the bridge. The main cables with a diameter of 1.30 m were already stretched over the pylons and the first segment of the superstructure was attached. The first suspension cable was transported across the river by a ship and brought to its end position by a crane. The bored piles for the foundation of the pylons are up to 128 m long. The 40.5 m wide upper deck was designed for eight lanes at a speed of 100 km/h. The lower deck was designed for four railway tracks with a maximum speed of 250 km/h. Various construction methods such as cantilever construction method and section-by-section manufacture method by using sectional scaffolding were applied for the approach bridges. The bridge is scheduled to be opened to traffic in 2020.

Author: Max Herbers

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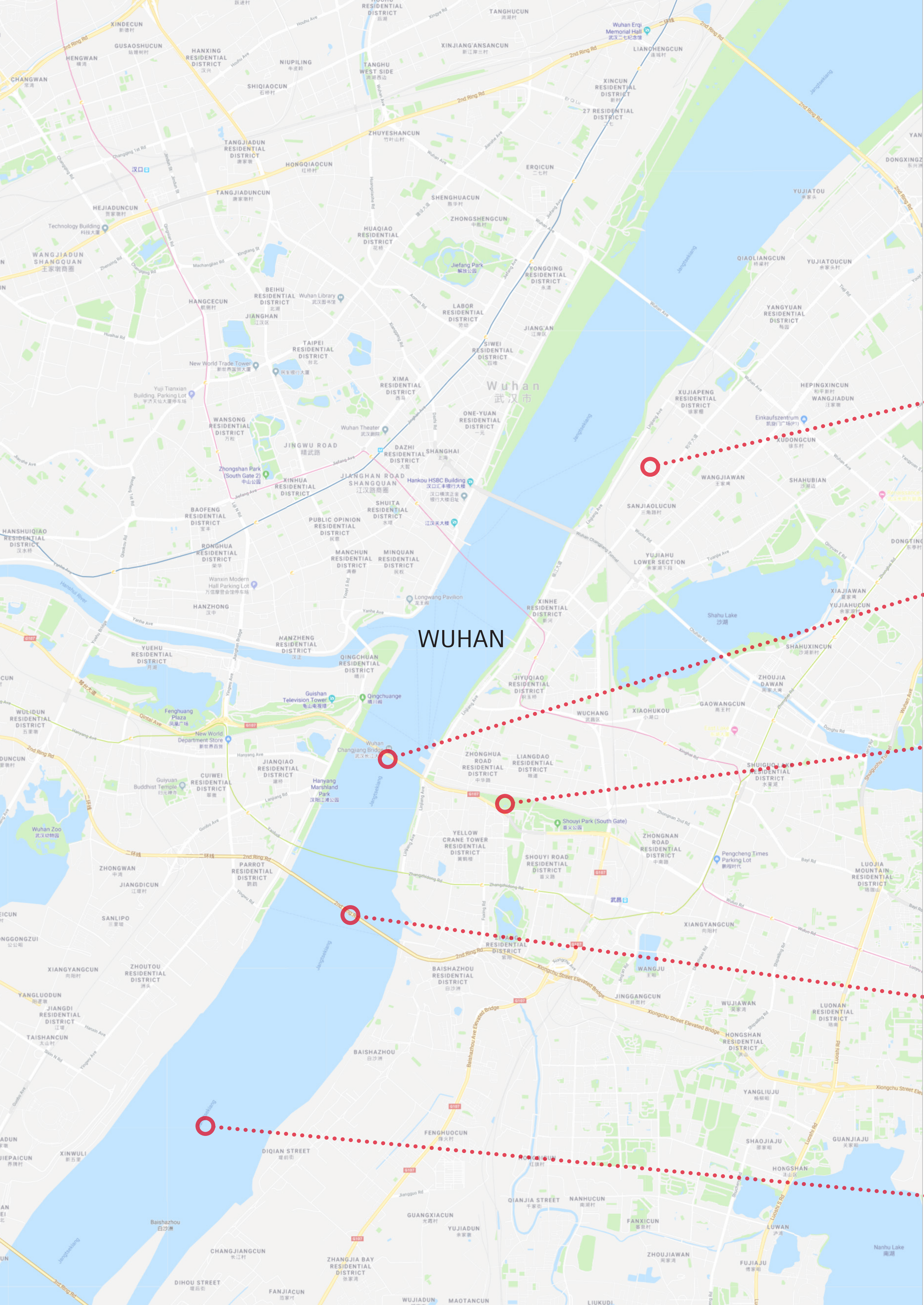

Qingshan Yangtze River Bridge

Greenland Center

Image source: skyscrapercenter.com
Author: Adrian Smith + Gordon Gill Architecture / CTBUH

First Yangtze River Bridge

Yellow Crane Tower

Yingwuzhou Yangtze River Bridge

Yangsigang Yangtze River Bridge

DAYS 5 - 8

WUHAN

11 – 14 OCTOBER 2019

DAY 5 - WUHAN

Friday, 11 Octover 2019

The Germans are coming, let's build a museum real fast!

On day five, we took the Chinese high-speed train from Zhenjiang to Wuhan. The long-distance train station was built like an airport in Europe. The luggages need to be checked by security and the entry to the platforms was only permitted shortly before the train entered. So we stood at a completely empty platform after admission and waited for our train. After a four-hour of travel, we arrived in Wuhan. Afterwards, we went straight to the hostel and checked in to our six to eight beds rooms. After a typical hot and noodle lunch at a local street bistro, we took the bus to visit the three-pylon Yingwuzhou Bridge, which was inspired by the Golden Gate Bridge.

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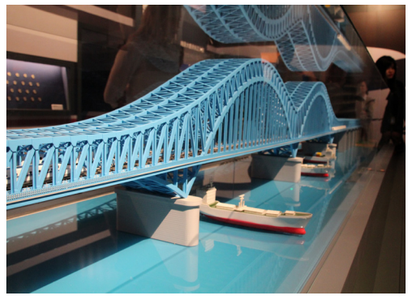
The highlight of the day was the visit to the bridge museum of the construction company "China Railway Major Bridge Engineering Group Co., Ltd.", where we were given an exclusive tour of the Chinese bridge construction history. The museum was planed to be opened to public in November 2019. During our visit there were still some constructions going on and the tour guiders did not seem to have the detailed knowledge after hundreds of tours. Nevertheless, we were offered an impressive insight into the many facets of Chinese bridge constructions, also outside of China. In the end, a company video was shown in the in-house cinema. The Chinese engieers are very proud of the international awards they have won. Many trophies and certificates were displayed in a display cabinet. We were introduced about how special these awards were and how difficult it was to win an international award as a Chinese company.

After an early dinner in the museum canteen we went back to the hostel, where we ended the evening with beers and card games and almost everyone fell into bed very early.

Author: Sajoscha Steinriede



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a Bridge Museum
b Bridge Model
c National and international prizes
d Yingwuzhou Yangtze River Bridge
e Group picture in front of Yingwuzhou Yangtze River Bridge

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鹦鹉洲长江大桥

YINGWUZHOU YANGTZE RIVER BRIDGE

Suspension Bridge
Total length: 2100 m
Max. span: 850 m
Height pylon: 153 m
Opening: 28 December 2014

With a total length of 2100 m and a length of the two 850 m main spans, the Yingwuzhou Yangtze River Bridge is one of the longest three-tower suspension bridges in the world. Construction of the bridge began in 2011 and it was completed three years later on December 28th, 2014. The costs amounted to 3.08 billion yuan which is around 393 million euros. The Yingwuzhou Yangtze River Bridge is located between the Baishazhou Bridge upstream and the First Yangtze River Bridge downstream. It connects the Wuchang and Hanyang districts. Yingwuzhou means Parrot Island, which was a famous island in poems of the Tang Dynasty, belongs to the district of Hanyang now due to the diversion of the Yangtze. With four lanes in each direction, the bridge is only designed for car traffic. A special feature is that the Wuhan City Authority had imposed design restrictions on the design of the bridge so that the cityscape and air traffic were not influenced by the height of the pylons.

A three-tower suspension bridge was therefore designed with a maximum pylon height of 153 m. The lower 45 m of the pylons are made of reinforced concrete and the upper part was constructed as steel constructions. The bridge girder is also a steel structure. Each foundation of the towers consists of 39 bored 2.8 m diameter piles. For the construction of the pylons and the lifting of the steel segments, the China Railway Engineering Group used a new type of lifting crane, which ensured the punctual completion of the bridge.

Author: Fabian Boße

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DAY 6 - WUHAN

Saturday, 12 October 2019

They place great importance on hospitality in China!

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Same as every day: Get up early, have breakfast, get ready and get on the bus. This time, the departure time by bus was at 8:30 am. An unusual luxury! Our first stop of the day was the Qingshan Yangtze River Bridge. The approximately 7.5 km long cable-stayed bridge looked impressive but seemed not outstanding any more after the two previous site visits. The Qingshan Yangtze River Bridge was similar to the Hutong Yangtze River Bridge. However, we had the opportunity to ask the manager and chief engineer many questions after they presented the Qingshang Bridge. They gave us a lot of exciting insights. Subsequently, we had lunch, which is delicious as always, on the construction site. With a lot of choices and good quality of food, everyone was more than satisfied. Until then, it was the best meal we had on the trip.

Afterwards we drove to the First Yangtze River Bridge with a maybe too full stomach. The 1.6 km long, double-decker road and railway truss bridge is the first bridge over the Yangtze. It was built from 1955 to 1957 with the help of the Soviets. Here we got a lot of insights and historical information. However, due to the tight schedule, we were not there very long and then went straight to the engineering office BRDI.

Here we were welcomed by the bridge design master Mr. Xu Gongyi. A Design Master is a very high title in China that only a few selected candidates could own. With appropriate respect, we had an informative discussion with him. He answered many questions and took a lot of time for us. We have already wondered why such an outstanding person, who has built so many brilliant bridges, could be so kind to sit down with us for such a long time. He actually has no real profit out of it. When he found out that we wanted to see his newest bridge the next day, he even offered to introduce the bridge personally to us the next morning.

After all questions had been answered, we gave presentations about the Institute for Concrete Structures of Leibniz University Hannover and the German high-speed railway bridges. Some differences in comparison to China could be seen in the presentations. Afterwards, we were invited to dinner together. Everyone couldn't believe what we saw there. On a huge round table there was just everything your heart could desire for. From fish to vegetables to cakes and even beers, which are anchored in the German culture, were not missing. It turned out that Chinese beers have, but not that much in common with German beers. And as you always wondered: how did we actually deserve this? We thought this Chinese company was planning to impress us and it definitely succeeded.

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To end this day properly, we drove to a viewpoint on the river bank, where we had a great view of the Wuhan skyline. In the course of the Military World Games, the entire skyline was illuminated with LED lighting. From the vantage point you could grasp a good overall picture of all the illuminated buildings and bridges. In addition, all lights of different buildings and bridges were coordinated. It looked like a rehearsed choreography.

Visibly satisfied and exhausted from all the food and impressions, we went back to the hostel afterwards. Since we didn't get back until around 10 pm, most of us just fell into bed. A long and successful day came to an end.

Author: Eike Schenk

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a Qingshan Yangtze River Bridge (construction site)
b Qingshan Yangtze River Bridge (construction site)
c First Yangtze River Bridge
d Presentations at BRDI
e Dinner at BRDI
f Skyline of Wuhan at night

青山长江大桥

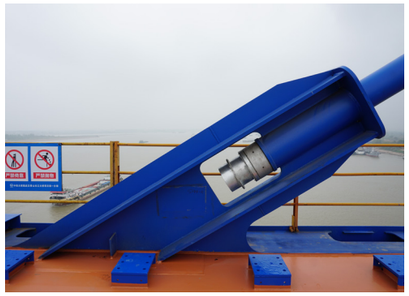
QINGSHAN YANGTZE RIVER BRIDGE

Cable-stayed bridge
(in construction)
Total length: 7548 m
Max. span: 960 m
Estimated completion
date: 2020

The Qingshan Yangtze River Bridge is built in connection with the expansion of Wuhan's fourth city ring. The intension is to support the expansion of Wuhan City as a logistics center in Central China. This bridge is constructed by the construction company China Railway Major Bridge Engineering Group Co. Ltd., which is able to construct 120 Birdges at the same time according to its own information.

It is scheduled to be completed in the spring of 2020. With a length of 7548 m and a width of 48 m, it will be the widest bridge over the Yangtze River. The bridge has five road traffic lanes per direction and a permissible speed of 100 km/h. With a span length of 960 m, it will be the longest cable-stayed bridge with a free-floating superstructure. This means that the superstructure is not connected to the pylons by means of crossbeams but directly suspended by cables in the pylon area. This reduces the effects of strong winds and earthquakes. The cross-section, shaped like an upside-down aircraft wing, also reduces the wind excitations. The superstructure is pressed down due aerodynamic effects and thus keeps the stay cables in tension. The segemental superstructure was welded together. This was to reduce the superstructrue weight. The connection of both sides took place on May 16th, 2019. The asphalt work started in mid-October and therefore not much further work is required until completion next year. To deal with such huge spans and overall lengths, a special size for the expansion joint with an expansion length of 2 m is required.

Author: Sajoscha Steinriede



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a Detail of the Qingshan Yangtze River Bridge
b Group Picture on the Qingshan Yangtze River Bridge
c First Yangtze River Bridge
d Detail of the First Yangtze River Bridge
e Detail of the First Yangtze River Bridge

武汉长江大桥

FIRST YANGTZE RIVER BRIDGE

Truss bridge
Total length: 1670 m
Max. span: 128 m
Opening: 15 October 1957

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The First Wuhan Yangtze River Bridge was built from 1955 to 1957 with Soviet help. It was completed two years earlier than planned. As the name suggests, it is the first bridge of 162 bridges over the Yangtze River, which until then had always been a natural border between the northern and southern parts of China. Before, the crossing of the river was only possible by boats and ferries, which led to hours of traffic jams and numerous serious accidents. Trains had to be transported carriage by carriage. This was why the entire crossing often took a whole day. The construction of the bridge is considered one of the main contributors to the economic boom in China and especially the Wuhan region. The immense importance was also evident in the naming of the Chinese: many newborns with a qiáo in the name, which means bridge in English.

The first plans for the construction of the bridge came up around 1910. The design came from Jeme Tien Yow, who was trained in the USA and the design was based on the Forth Bridge in Scotland. However, economic restrictions, the First World War and the Chinese Civil War prevented the execution of the plans until the 1950s. Shortly after the foundation of the People's Republic of China, the planning of this bridge resumed. This bridge was titled as "a success for the new democratic revolution in China" by the new government. To build the bridge, the Yellow Crane Pagoda had to be moved and rebuilt in 1985 at a distance of about one kilometer away from its original location. The superstructure of this bridge is a two-story truss with four lanes for road traffic on the upper story and two railroad tracks on the lower story. The total length including the approach bridges is 1670 m and the width of the deck is 22.5 m. The main bridge consists of nine spans, each span is 128 m long. A total of 25 thousand tons of steel and around one million rivets were used for the superstructure. The cantilever construction method was applied to construct the bridge. The masonry pillars were built with hollow cross-sections. The bridge is in very good condition even after 60 years of operation. With scientific strengthening and evaluation methods, the service life can be extended to 150 years.

Author: Max Herbers

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DAY 7 - WUHAN

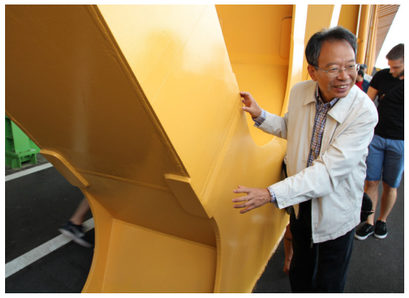
Sunday 13 October 2019

Xu Gongyi gave us a private tour of his bridge!

Our last day in Wuhan started very early with a more or less typical Chinese breakfast. Since we knew the area around the hostel well, it was possible to order without hands and feet, unlike the days before. At 8:00 a.m. we took the bus towards Yangsigang Yangtze River Bridge, where we met the Design Master Xu Gongyi. Fortunately, the bridge was completed and opened for traffic just a few days before we arrived. After a few photos and explanations, we were able to reach the bridge deck from the foot of the bridge by using the stairs in the bridge tower. On the deck, Design Master Xu Gongyi told us a lot about the peculiarities of the bridge, showed us the force transmissions at junctions and answered all our questions. André also gave a short presentation on the Yangsigang Yangtze River Bridge and added some information that we had not yet learned from the Design Master. A special highlight was Andrés video about the construction process of the bridge, which also impressed and delighted Mr. Xu.

At 11:00 a.m., we reached the Yellow Crane Pagoda Park. After a short walk through the park, Dean held his presentation on the pagoda. He was unfortunately interrupted by the roar of a huge bell, which was often struck by tourists. Nevertheless, we learned a lot about the pagoda, which has been rebuilt twelve times. Inside the pagoda, we climbed to the top, from where a good view of Wuhan city and the Yangtze can be captured. Afterwards, we also brought some souvenirs. The Yellow Crane Pagoda is one of the most popular and important tourist attractions in China. It was no wonder we became the subject for photos of Chinese tourists again as a group of German tourists. Maybe it was also because André and Jan-Hauke picked a pomelo from the tree (of course, they got permission from the workers there). On the way back to the bus, we had a walk over the First Yangtze River Bridge and then drove to lunch, which may no longer be called lunch as it was already 2:30 p.m.. Nevertheless, thanks to the large selection in the food court, the food there was very tasty.

After lunch, we continued our program visit to the nearby Wuhan University. Unfortunately, the contact with the university was not established, we were not able to get a guided tour of the university buildings, but the way across the campus was impressive enough. The university is often regarded as the most beautiful and greenest university in



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a Yangsigang Yangtze River Bridge
b Yangsigang Yangtze River Bridge
c Yellow Crane Tower
d Soccer game at campus
e Lake Donghu
f Group picture at Lake Donghu

d

e

China, which we could confirm after our tour through the campus. The tour ended with a spontaneous soccer game against a selection of Chinese and international students. The German team won with a 2-0 victory and demonstrated the international class of German football despite Max injuring his knee.

At 5:00 p.m. we walked back to the hostel. The path led us along the shore of Lake Donghu and a break was used by Sajoscha, Till and Mirko for a short dip in the lake. The water was not very deep, which did not prevent the three from diving in. There, we were again the attraction for the Chinese, because it is probably not so common to swim in the lake in October, although we had also seen swimmers in the Yangtze. Fortunately, everyone remained unharmed and after an almost three-hour march with several breaks, we finally got back to the hostel. After dinner in small groups and quick shopping in the nearby mall, some of us fell into beds exhausted. Others enjoyed the rest of the evening with board games.

Author: Maximilian Küchler

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绿地中心

GREENLAND CENTER

Skyscraper
(under construction)
Height: 500 m
Estimated completion
date: 2020

Image source: ft.com; Autor: Keitma/Alarmy a

The Wuhan Greenland Center, which is designed by the architectural firm Adrian Smith and Gordon Gill Architecture, was planed to reach a height of 636 m with 125 floors when it is completed in 2020. It would surpass the Shanghai Tower and become the tallest building in China. However, due to restrictions of the government, a reduction of the total height was demanded. The airport close by limits the skyscraper to only about 500 m.

The Wuhan Greenland Center Tower symbolizes the growing diversity of Wuhan. As with many high-rise buildings of this size in China, the focus of the building design was on the wind and earthquake conditions. Based on this background, the tower was designed to have a triangular floor plan that tapers with increasing height. This is intended to achieve better stability against seismic interventions and wind events. The triangular shape is based on three large reinforced concrete columns that taper upwards. These columns meet at the top and form a 61 m high crown structure. The dome is made of glass. At some points in the building, slots are built into the building envelope, which should lead to wind load reduction.

The architects also paid special attention to energy consumptions. The wastewater is recycled in the tower and reused in the high-rise's air conditioning system. The water-in installation system and the lighting system are also designed to achieve the lowest possible consumption. The Wuhan Greenland Center consumes about 51% less resource than a typical office building with similar sizes.

Author: Irina Müller

Image source: skyscrapercenter.com
Author: Adrian Smith + Gordon Gill Architecture / CTBUH b

Image source: youtube.com c

a Greenland Center (under construction)
b Visualisation of the Greenland Center
c Greenland Center (under construction)
d Yangsigang Yangtze River Bridge
e Yangsigang Yangtze River Bridge

d

杨泗港长江大桥

YANGSIGANG YANGTZE RIVER BRIDGE

Suspension bridge
Total length: 4.1 km
Max. span: 1700 m
Opening: October 2019

The Yangsigang Yangtze River Bridge was inaugurated in Wuhan in October 2019. With a span of 1700 m, it is the longest double-deck suspension bridge in the world. The purpose of the construction of the Yangsigang Yangtze River Bridge is to relieve the neighboring bridges from heavy traffic. The bridge has twelve lanes in total. Six of them with 80 km / h design speed are on the upper deck. The other six lanes with 60 km / h design speed are on the lower deck. The total length of the bridge is 4.1 km.

The construction of the Yangsigang Yangtze River Bridge took around five years and cost 1.14 billion euros. The main suspension cables have a diameter of 1.07 m each and are able to carry a weight up to 65,000 t. The superstructure was built with a segmental construction method. The segments were transported using a ship pontoon and lifted to its design height using a crane. A special crane had to be designed for this construction process because the superstructure segments weighed around 1000 t. The 1.7 km long main span was thus completed in a record making time of shorter than two months.

Author: Fernando André Lincango López

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黃鶴樓

YELLOW CRANE TOWER

Pagoda
Wooden Construction
Height: 51 m
Opening: 223 n. Chr.

The Yellow Crane Tower is a cultural and historical building in Wuhan, Hubei Province, which locates in the middle of the People's Republic of China. The pagoda was built in 223 AD during the Three Kingdoms Period as a lookout and fortress tower for wars at that time. The pagoda has been destroyed and rebuilt twelve times over the centuries.

This pagoda is a typical Chinese sytle wooden structure with a construction height of almost 51 m. The pagoda has five accessible floors in total and was constructed in an octagonal shape. In China, it is one of the four largest and greatest human-built towers and is now a sacred place for Daoism.

The Tower was rebuilt for the last time at its original location in 1868. However, it was again destroyed during wars a few years later. Afterwards, it was built in 1907 at a new location, the Snake Mountain. In favor of the first Yangtze River Bridge, however, the pagoda had to be destroyed again in 1952. It was around 30 years later, today's pagoda was built in a new location. It was completed in 1985 and is now one of the most popular tourist attractions in Wuhan. In China, it has achieved great fame because of the renowned poems by Cui Hao and Li Bai. These poems and poets have been always important subjects in school.

Author: Dean Lowles

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a Yellow Crane
b Group picture in front of the Yellow Crane Tower

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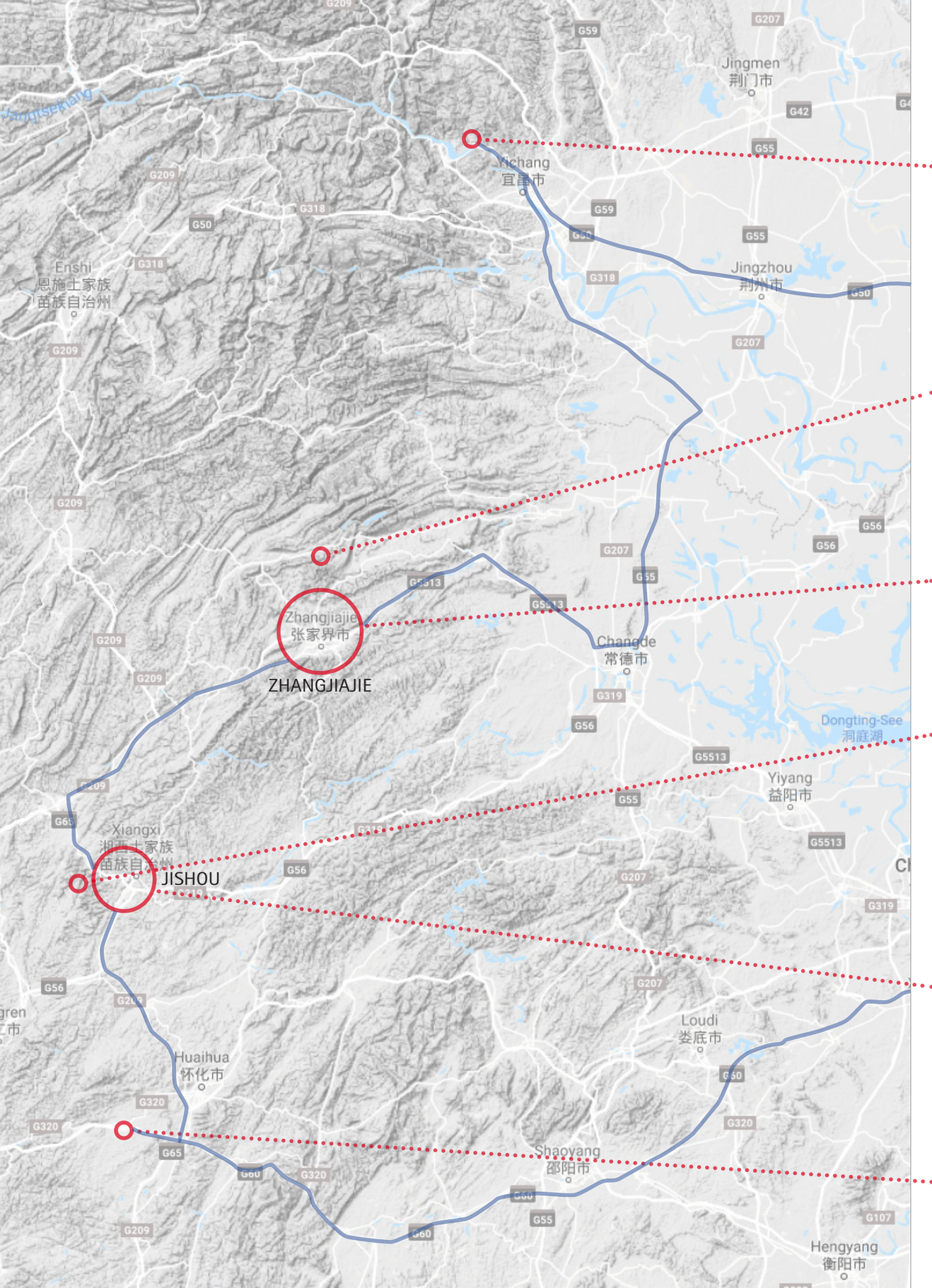

Three Gorges Dam

Glass Bridge

Zhangjiaje National Park

Aizhai Bridge

Jishou

Longjin Wind & Rain Bridge

DAYS 8 - 12

ZHANGJIAJE
JISHOU

14 - 18 OCTOBER 2019

DAY 8 - THREE GORGES DAM

Monday, 14 October 2019
More superlatives!

a

After the alarm clock rang at 5:30 in the morning, we started looking for a decent breakfast. We boarded the bus towards the Three Gorges Dam in Hubei Province at 6:45 a.m. when we had been strengthened by Baozi. The tour guide joined us on our way to the destination at about 12:00. In another hour's drive, we reached the long-awaited destination: the Three Gorges Dam, which is a superlative construction! Linda brought the project closer to us through her presentation: The dam consists of a hydroelectric power station, a double lock and a boat lift. The Yangtze River is retained over 663 km by the dam. The main reasons for the construction were flood protection and energy generation. Critical aspects were also discussed. No other major project has been as controversial in recent years as the dam in the People's Republic of China. Mass relocations and a significant impact on nature as well as garbage problems and droughts were the major resulted topics.

The expectations for visiting this mega structure were high. However, the possibilities are very limited to certain programs and we could only look at the dam as tourists.

After what felt like an eternity, we reached our accommodation in Zhangjiajie at 11:15 p.m., where we fell into bed exhausted after a delicious dinner. We spent about 13 hours in total on the bus that day. The bus driver kept himself awake with constant and arbitrary honking. Inspiring!

Author: Max Herbers

a Boat lift
b Group picture at the Three Gorges Dam
c Three Gorges Dam
d Locks

b

c

三峡大坝

THREE GORGES DAM

Gravity dam
Length: 2335 m
Height (wall crown): 185 m above sea level
Building volume: 28 Mio. m^3
Construction period: 1995 - 2008/2012

The Three Gorges Dam includes a hydropower plant, an additional ship lift and a double lock. This project was launched to meet China's growing energy needs and to improve flood protection and ship transportation conditions.

DAM:
The Yangtze River is dammed by a concrete gravity dam over the Three Gorges. The gravity wall is not clamped into the flanks of the valley, instead, it is dimensioned in such a way that its own weight is greater than the floating bottom water pressure. The wall crown lies 181 m above the foundation and extends for a length of almost 2 km. The water level changes depending on the seasons. The normal water level difference in both sides of the dam is up to 113 m, which corresponds to the maximum stroke of the ship lifting system. The flood design flow is 113,000 m^3 / s, but the regulated discharge in the dry season is only about 5% of this flow.
The hydroelectric power station in the wall is the largest of its kind on earth. 22.5 GW of electricity is produced here every year. Electricity is generated by 32 turbines of 700 MW each, plus two turbines of 50 MW each to cover the company's own needs.
A reservoir is dammed up by the wall, which with approx. 40 billion m^3 has about 80% of the volume but has twice the surface of the Bodensee in Germany. Take the Bodensee as a comparison, the lake will be over 600 km long when the capacity level is reached.

LOCKS:
In addition to the dam, there are two five-level locks, each of which is 6400 m long. The height difference is about 100 m and can be overcome in approx. four hours.

BOAT LIFT:
The ship lift is dimensioned for ships up to 13000 t. Although it was originally designed with cable pulls, these loads could eventually only be moved safely with a rack-and-pinion drive, a rotating spindle and 256 1000 t counterweights.

GROUND:
The ground load-bearing capacity was improved with the help of concrete injections with a depth of up to 140 m. The concrete functions also as sealing material. To improve the slope stability, pre-tensioned steel cables were applied to the drainage systems, the shotcrete protections, and back-anchorings. (1000 kN and 3000 kN tensioning cables).

Author: Linda Bücking

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DAY 9 - NATIONAL PARK

Tuesday, 15 October 2019

As you can see, you can't see anything!

The ninth day was a very nice change from the other days of our trip, which had been heavily planned. No bridges or structures should be visited that day. Here nature could be enjoyed to its fullest. The city of Zhangjiajie is a small mountain town and has been an UNESCO World Heritage Site since 1992.
In the national park, it was about 13°C that day, it was rainy and it was very, very foggy. Some of us bought rain ponchos or shoe covers on the way. Once at the foot of the Avatar Mountains, the view, as far as it went up, was breathtaking. The foggy mountain peaks were spectacular. The landscape was breathtaking and impressive.

a

Our group had opted for the sportiest variant: walking up 8,000 steps, which led up to the top of the mountain. During the sweaty climb, the 13°C suddenly felt like 20°C. The climb was very strenuous. Some of the steps were not only of different sizes but also very wet and steep. The group was separated many times on the way up. As some of the group finally reached the peak of the mountain, the view was unfortunately blocked by a white blanket of fog. This weather phenomenon was actually quite usual because sunshine is generally very rare in these mountains.

It was a little upsetting to get no rewarding view after such a sporting session. There were many monkeys when we finished hiking and this gave us great pleasure. Overall, the hike was fabulous, even if there was not much to see from above. The path and the national park is definitely worth a visit!

Author: Irina Müller

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c

a Avatar Mountains
b Monkey at National Park
c Staircase to the viewpoint
d Glass Bridge
e Nationalpark
f Presentation in front of the Aizhai Bridge

d

DAY 10 - NATIONAL PARK

Wednesday, 16 October 2019

Caution, wet floor!

Unfortunately, the second day in Zhangjiajie also started with rain showers and heavy fog. The chance to experience a spectacular view in our national park tour today seemed quite low.

As usual, we had breakfast together in the hotel early in the morning and then continued with our "speed shuttle". In half an hour, we arrived at our next destination, the glass bridge. The anticipation was very high and everyone was excited to see if we could have this impressive experience with a good view.
Lo and behold, we finally got some luck. The wall of fog disappeared and it drizzled only a little. So the view at a height of 300 m was absolutely spectacular but unfortunately not for the ones, who have fear of heights. However, the drizzle led to Sajoscha underestimating the friction coefficient of the wet glass floors. He mutated into a human bowling ball and knocked down a Chinese tourist. After the bridge, we went down along a steep rock surface with several hundreds of stair steps into the valley. In the valley, we hiked for a while along a river through the national park, where the true beauty of nature was revealed to us. When we finished, our guide and our speed shuttle were waiting for us to drive us to lunch.

After a short refreshment, we went straight to our next spectacular bridge, the Aizhai Bridge. Deep between two mountains, a path with glass floors led us along a rock surface to our desired destination. The red superstructure protruded from a thick wall of fog and showed all its magnificent glory. Mirko presented us this beautiful construction and gave us some interesting facts. The visit ended with a small inspection on the lower level of the superstructure. Then the speed shuttle drove us to our next accommodation, where we had dinner together. After a nice but also exhausting day, we relaxed in the hotel and looked forward to the next day.

Author: Dean Lowles

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张家界大峡谷玻璃桥

ZHANGJIAJIE GLASS BRIDGE

Suspension Bridge
Max. span: 430 m
Height above ground: 260 m
Opening: 20 August 2016

The glass bridge in Zhangjiajie is a pedestrian bridge, which was constructed as a suspension superstructure. It has a span of 430 m and a height of 260 m above the ground. It was the longest and tallest glass bridge in the world when it was opened in 2016.

The name glass bridge comes from the fact that a total of 99 glass panels were laid on the floor of the bridge. This allows a direct view through the deck down into the valley. The bridge spans the canyon between two mountain cliffs in Zhangjiajie National Forest Park in China's central Hunan Province.

As already mentioned, the bridge was officially opened on August 20th, 2016. The construction of this bridge cost around 460 million Yuan, which corresponds to around 60 million euros. There are now around 2,300 different glass bridges in China and with the opening of another bridge in Hebei Province, it is now the second-longest glass bridge in the world.

Author: Dean Lowles

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a Glass Bridge
b Glass Bridge
c Aizhai Bridge
d Pylon of the Aizhai Bridge
e Truss of the Aizhai Bridge

b

c

矮寨大桥

AIZHAI BRIDGE

Suspension Bridge
Total length: 1534 m
Max. span: 1176 m
Height above ground: 350 m
Opening: 31 March 2012

The Aizhai Suspension Bridge locates in Hunan Province, which is in central China, near the Aizhai Village. The bridge is the longest mountain valley suspension bridge in the world. The depth of the Dehang Grand Canyon is 350 m. The total length of the bridge is 1534 m. This bridge is constructed for highway traffic with four lanes, it is a part of the national highway line from Changsha to Chongqing. The total cost of the construction amounts to around 550 million euros. The construction of the bridge started in 2007 and ended in December 2011.

Both pylons are based on rock foundations, which are also on the mountain peaks. The foundation on the west side is very stable, whereas the foundation on the east side is not of very good quality. Therefore, the large underground caves were grouted with concrete and holes were injected with cement. Both pylons are constructed with the form of two-column reinforced concrete frames, which are strengthed in the horizontal level with two cross beams at the top and in the middle of the frame. In contrast to a typical suspension bridge, the superstructure of this bridge is separated from the towers. Accordingly, the length of the superstructure is only 1001 m, which is about 175 m shorter than the main span (1176 m) between the two pylons.

The main bridge cable is made of high-strength steel wires; the diameter measures 86 cm when all wires have been tightened. There are 71 pairs of suspension hangers, which carry the bridge structure. To carry the main cables from one side to the other side of the valley, a helicopter was used. The steel truss section, which is 27 m wide and 7.5 m high, was constructed as the bridge superstructure. In total, 69 truss segments and a middle segment was constructed. The upper and lower main girders are rectangular box sections and the diagonals are I-profile beams. The weight of one segment is 125 t.
The installation of the truss sections began in the middle and then proceeded symmetrically to both sides. The "Cable Track Installation System (CTIS)" construction system was developed for the lifting, transporting and assembling of the steel truss segments. The system consists of two cableways, along with moveable carriages which supply the lifting devices.

Autor: Mirko Kiewning

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DAY 11 - WIND- & RAIN BRIDGE

Thursday, 17 October 2019
The language "Dance" is universal!

a

After the delicious noodle-with-tea breakfast, we left Jishou at 7:45 a.m. and drove to Zhijiang for about 2.5 hours. We came to a city which, at first glance, was not so comprehensively modernized and was more (according to our prejudice) classic-Chinese and therefore less international. The curious glances of some residents in the city accompanied us on our way. We took a glimpse into rather simple Chinese life: women were still doing their laundry in the river, others were dancing and singing, some older men were playing cards.

We walked over the Longjin Wind and Rain Bridge, the oldest bridge we visited on our excursion. The bridge, built in 1591 and today with a length of approx. 252 m, fascinated us with its wooden construction, the diverse shops on the bridge and the very lively, noisy hustle and bustle in the building. In addition to the purchase of clothes and food, it was also possible to pull teeth by alleged dental practices on the bridge, whose hygiene standards seemed questionable to us.

On a street next to the bridge, we met joyfully dancing young women whose zest for life captivated us. When they saw us, they immediately invited us to dance together. We happily took part in the joyful dance with these Chinese women for some minutes. Chongjie said that the Dong minority members were singing traditional songs. Afterwards, we visited a temple nearby, where some Chinese prayed to a goddess surrounded by incense sticks and candles. After a tasty lunch at 12:00, we took the bus from 1:00 pm to 7:40 pm to Changsha, where the Welcome Committee of the Central South University competition welcomed us and invited us to a princely dinner.

Author: Till Heße

b

c

a Group dance
b Typical Buildings
c Temple incense burner
d Longjin Wind & Rain Bridge
e Longjin Wind & Rain Bridge

d

芷江龙津风雨桥

LONGJIN WIND- & RAIN BRIDGE

Historical Bridge
Wooden construction
Total length: 252 m
Opening: 1591

The Feng-Yu-Qiao, in English wind and rain bridge, is located in Zhijiang in Hunan Province. It was built in 1591 for a well-known monk and is the longest bridge of its kind in the world with a span of 252 m. Since its construction, it has been repaired and rebuilt several times. The last time was in 1999 when the government renovated it with an investment of six million yuan (0.78 million euros). The bridge is supported by 16 pillars, which reminiscent of ships from afar. The deck is 12 m wide. The bridge is built entirely out of wood. This means that no rivets or nails have been used for the connections. It is a typical building for the Dong ethnic minority based in the region and stands for naturalness, harmony and beauty. In the past, a wind and rain bridge was not only a bridge over a river but also the entrance to the village and a symbol of the village. A special feature of the wind and rain bridge is the walkway with a width of 6 m, which is intended to protect the visitor from wind and rain.

Inside, it is decorated with paintings and calligraphy and invites you to relax. Local businesses are located on both sides of the walkway. The bridge has a total of seven pavilions with different heights and roof structures. In contrast to the rest of the bridge with three eaves, the pavilions have five projections. The bridge also bears the name "Black Dragon Bridge" as its shape and the dark blue, glazed roof tiles remind one of a dragon lying above the river.

Author: Maximilian Küchler

e

Fuyuanlu Bridge

Lucky Knot Bridge

Juzizhou Bridge

International Student Competition
Central South University
Seismic Design of Bridges

International Student Competition
Central South University
Self-Compacting Concrete Design

Student Symposium
Central South University

DAYS 12 - 15

CHANGSHA

18 - 21 OCTOBER 2019

DAY 12 – INTERNATIONAL STUDENT COMPETITION CHANGSHA

Friday, 18 October 2019
The competition is real!

On day 12 we woke up in the luxurious beds of the "Millenia 21" hotel in Changsha. Although the night was very short, we were all ready for an exciting day and started at 06:30 with a hearty breakfast. The international student competition at Central South University (CSU) in Changsha was right in front of us. After a 20-minute bus ride, we arrived at the railway campus. The opening ceremony of the competition began at 9:00 a.m., during which the individual teams from three different countries were introduced. In addition to numerous participants from the most diverse regions of China and a group from Thailand, the Institute for Concrete Construction took part with three teams. The institute was to compete in two tasks with international competition in the field of designing earthquake-proof bridge structures and the development of high-performance self-compacting concrete (SVB). After the introduction of the participating groups, promotional videos of Central South University were shown and several speeches by members of the university were given - unfortunately in Chinese. The opening ceremony ended up with a group photo shooting of the competition participants. Then, a guided tour to the halls of the National Engineering Laboratory of High-Speed Railway Construction was carried out. We had the opportunity to have a look at the test stands such as wind tunnels for high-speed trains or oversized pressure testing machines for wall-like reinforced concrete beams.


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It is astonishing that in China, verifications and measurements of structures under dynamic effects are mainly carried out using scale models rather than numerical calculations. With this knowledge, the teams then went to the test halls, where the different competition disciplines were to be held in the following day.

For the two German teams that worked on the modeling of earthquake-resilient bridges, it was a great disappointment when it became clear that the bridge segments printed by the CSU were too weak and even parts of the individual models were missing. Before this problem could be solved, we were allowed to get to know the quality of the canteen food. Despite the extensive lunches and dinners that we were able to enjoy the days before, the cafeteria food was very tasty and varied. Invigorated by the Chinese lunch, the preparation work for the official competition began. The bridge components were dealt with hammers, files and knives so the parts could be put together. The hope still remained because of the announced, timely completion of the missing parts. Therefore, we work on the 3D printed bridge constructions until the evening hours.

However, the time-consuming work of the large group was in vain when the Chinese group supervisors brought us the bad news that the missing bridge parts could no longer be manufactured. Although there was still the possibility to repair the bridge, which had been printed in Germany in advance and partially destroyed during our flight, and test it on the day of the competition. It was mostly frustrated to go back to the hotel, where we could discuss what we had experienced while sitting together.


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The third German team, which was involved in the development of a high-performance, self-compacting concrete, was surprised that no preparatory work had to be carried out in the concrete laboratory as announced. Instead, the official competition started immediately. The hysterical start of the other teams did not discourage our three boys. Afterall they did not need that much time for an orderly process of the mixture design to enalbe the fresh concrete to achieve the desired performance.

This group also returned to the hotel exhausted in the evening. The initially cloudy mood of the other two teams was significantly improved by the very good performance of the third group. We ended this day with a conciliatory conclusion in the hotel lobby with drinks, music and board games.

Author: Jan-Hauke Bartels


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a Welcome Ceremony
b Railway Campus
c Competition preparations
d Blocking ring test
e Competition preparations

DAY 13 – INTERNATIONAL STUDENT COMPETITION CHANGSHA

Saturday, 19 October 2019
Our bridge sustains!

After an extensive hotel breakfast in the morning at 8:00 a.m., we took a shuttle bus to Central South University to prepare the bridge for the competition in the last minutes. Unfortunately, we still did not know whether we were even allowed to take part in the competition because the important bridge parts were not printed with the 3D printer in China and our replacement bridge was destroyed by Lufthansa during the flight to Shanghai. The presentations of the bridge models by other participant teams, which were unfortunately held in Chinese, began at 9:00 a.m.

In the meantime, the SVB team went to participate in the evaluation of their competition. At first, things went very well for Mirko, Dean and André and they were highly praised by the professors. However, the designed form was not fully filled. Fortunately, it was still good enough for a second place. However, it must be said that the winning team added water afterwards and the consistency of the self-compacting concrete was too fluid in contrast to the work of other participating teams.
In the meantime, the bridges of the other teams were tested on a shaking table subjected to simulated earthquake loads. After the lunch break in the cafeteria, we were given the opportunity to strengthen and glue our broken bridge parts so we could still take part in the competition with the test setup of the previous year. As a result, part of the group stayed at the university and repaired the bridge. The rest made their way back to the hotel to prepare for the upcoming workshop. Because of the unclear communication flow, this did not take place on the 14th floor of the hotel as originally thought but on the 14th floor of Central South University. During the workshop, some students from Central South University and six students from other universities presented the respective university and their own city. This was followed by a discussion on various topics relating to the course and cultural differences.

After a long day at the university, we hiked to Yuelu Mountain. According to the hotel staff, we should only need 50 minutes to hike to the top of the mountain. However, it took us two hours in the end, but we were rewarded with a wonderful view of the whole city.

Author: Sandra Jürgens


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a Competition preparations
b Shaking table
c Presentation at the Symposium
d Presentation at the Symposium
e Student Symposium


d

STUDENT COMPETITION – STUDENT SYMPOSIUM

International Student Competition at Central South University

Student Symposium

On October 19th, at 2:30 p.m., the workshop "The 2nd International College Student Invitational Competition of Technology Simulation for High-speed Railway Competition - Student Symposium" started at Central South University Changsha, in which students from different universities participated.

Some specialities from Changsha were presented as an introduction, e.g. a typical milk tea from the region. This was followed by two presentations about Central South University and the Changsha city itself by some local students. Subsequently, Irina, Lisa and Sandra presented the structure of the Leibniz University Hannover; Linda and Eike introduced the research and doctorate program of the Insitute of Concrete Construction; Fabian and Maximilian shared their life and study experience at Leibniz University Hannover.
After another break with small snacks and tea, an open discussion was carried out. Since basketball is very popular in China, they started by asking if we knew Dirk Nowitzki. The moderator presented various topics that we talked about. We exchanged information about the differences of our universities, topics about job hunting and working life, as well as high-speed routes between China and Germany. We learned that it is much more difficult for women in China to get a good job in the field of tunnel engineering due to some conservative traditional ideas. In addition, the competition of good jobs is generally very fierce in China.

Author: Sandra Jürgens

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STUDENT COMPETITION – BRIDGE DESIGN

International Student Competition at Central South University

Seismic Design of Bridges

a

PREPARATION:

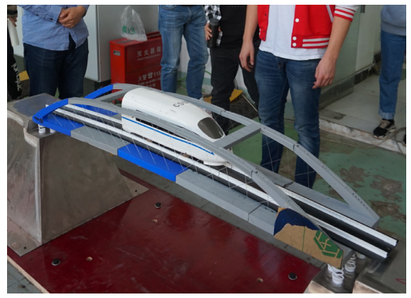
As part of the international student competition "The 2nd international College Student Invitational Competition of Technology Simulation for High-Speed Railway Construction" at the Central South University (CSU) in Changsha, China, the Institute for Concrete Construction participated with three teams. Two groups competed in the "Seismic Design of Bridges" task. The task required the design of a bridge model, which is able to resist a simulated earthquake loading, for high-speed railways. The scaled model was printed by a 3D printer. By comparing the variants, a network arch bridge turned out to be reasonable and was thus finally chosen. Vibration-reducing elements such as springs and a position-securing support components were planed to resist the dynamic loading.

One obstacle in producing the bridge with the 3D printer was the required length of 1.10 m. Since the print volume was not sufficient to print the bridge as a whole, the bridge construction was divided into segments and then connected with connector components. In addition to the CAD modeling, a numerical analysis (CAE) was carried out as part of a modal analysis. By considering the dynamic excitation and comparing the system-dependent natural frequencies with the relevant excitation frequencies, resonance effects could be excluded.

Another challenge was that the task was changed shortly before we left for China. Therefore, it was no longer possible to revise the model. It was decided to accept the help offered by CSU, to print the bridge with the required new dimensions on site. Therefore, we could officially participate in the competition. Nevertheless, the original net-arch bridge based on the old task was completed and taken to China in individual parts. However, when we arrived at the airport in Shanghai, the bridge model was damaged due to the irresponsible work of Lufthansa. The only hope remained on the bridge, which should be printed by CSU in China. It turned out that this hope was also unrealistic. Some in-site printed bridge segments were not of the desired quality and some individual parts were even entirely missing. Despite the Chinese competition organizer invested great efforts, a bridge model according to the new task could not be completed.

DAY OF THE COMPETITION:

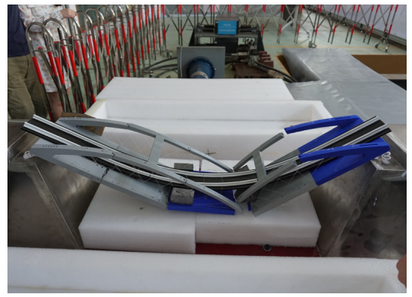
On October 19th, the competition officially started. Six teams were registered for the task "Seismic Design of Bridges". The concepts of the individual bridge designs from other teams were presented in sequence and the models were tested on an earthquake shake-table. In the meantime, our two teams worked meticulously on the bridge structure, which was damaged on the arrival flight, in order to repair it with the help of glue and plastic plates.



b

a Preparations
b Bridge model on the shaking table
c Preparations on the shaking table
d Bridge model after breaking
e Group picture in front of the bridge model

c



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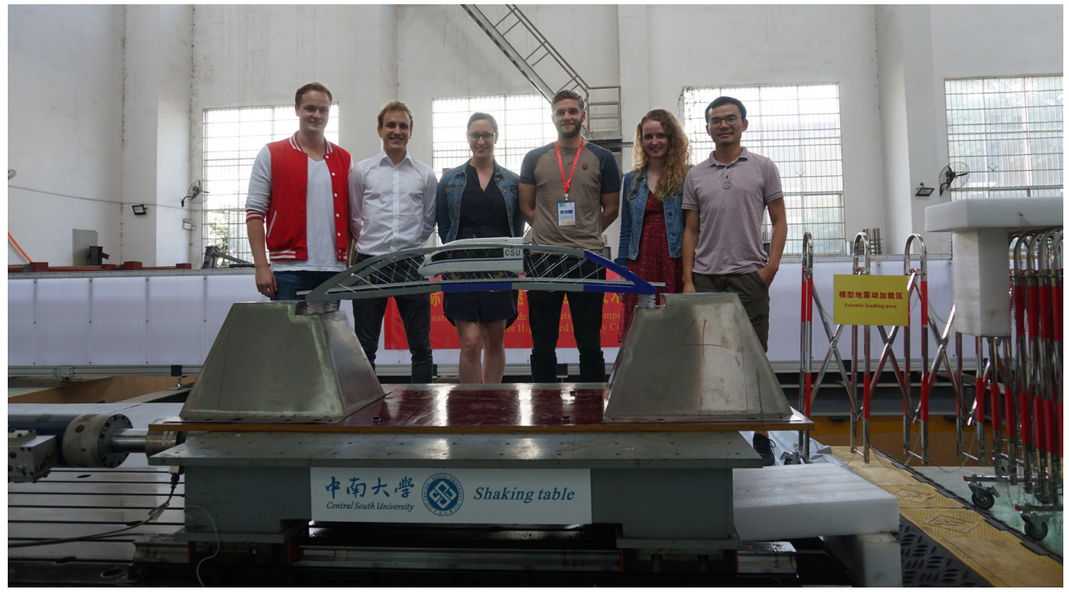
After all participating teams finished testing their models, our bridge model could finally be tested as well. After assembling the model, connecting it to the abutments and connecting the abutments to the earthquake simulation table, the test could be carried out on the test platform, which was built according to the old task from 2018. A sixty-second dynamic base excitation load was applied to the structure, which was simultaneously under a static load of 10 kg. Level 6, 7, 8 and 9 earthquakes according to the Richter scale were simulated in both longitudinal and transverse directions on the bridge. Although the construction was only roughly repaired with bare hands, it was able to achieve remarkable results due to its high slenderness and load-bearing capacity. In the end, it broke down, when the load level in the transverse direction was comparatively high.

The arrangement of spring elements and the associated decoupling of the superstructure from the abutments significantly reduced the stress. Although the preparation was very time consuming and there were many problems with the implementation, the competition came to a successful end and we left the competition with a positive feeling.

Author: Jan-Hauke Bartels



e

STUDENT COMPETITION – SELF-COMPACTING CONCRETE

International Student Competition at Central South University

Self-Compacting Concrete Design

PREPARATION:

At the competition "The 2nd International College Student Invitational Competition of Technology Simulation for High-Speed Railway Construction" at the Central South University in China, the Institute for Concrete Construction also had a team taking part in the task "Self-compacting concrete of CRTS III slab- type non-ballast track". The aim of this task was to develop a SVB mixture and test its strength in the end. The flow and blocking tests were carried out with the fresh concrete. Afterwards, the fresh concrete was to fill in a special formwork with the shape of 'CSU' (the initials of the host university). The quality of the recipe, the performance of the fresh concrete, the filling capacity and the strength of the concrete were assessed.

Our team consists of three members: Mirko, Dean and André. The team was supervised by Matthias. Mirko wrote his seminar paper on this topic as a preparation for this task in advance. Accordingly, a potential mixed design was already developed in Hanover and the concrete test was also carried out on a trial basis under similar conditions.

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DAY OF THE COMPETITION:

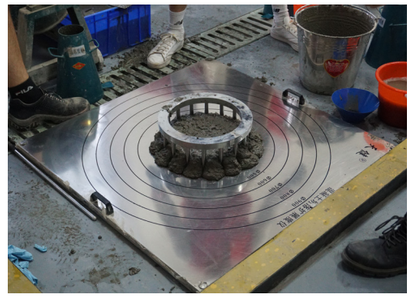
The competition took palce on Friday, October 18th. There were five participating teams. Besides the three teams from the hosting university, there was also a team from Bangkok.

After a brief greeting, some task sheets were distributed. These task sheets contained all the necessary information about the materials to be used. A mixed design should then be created based on the given values. We had 45 minutes to create the mix design and another two hours to mix, test and pour. After adjusting the material proportion according to the seminar paper, we started weighing the individual substances.
The final mixed design was:

Cement CEM I 42,5 R	340 kg/m^3
Fly ash	170 kg/m^3
Superplasticizer (PCE)	4,67 kg/m^3
Water	170 kg/m^3
Aggregate sand 0/2	815 kg/m^3
Aggregate gravel 2/8	504 kg/m^3
Aggregate gravel 8/16	336 kg/m^3

After weighing the material independently for a desired amount of 25 L mixture material, we started mixing the materials together. After about three minutes mixing time, the set flow test was carried out to check the flowability. The fresh concrete achieved a slump flow of 78 cm and showed no signs of segregation. This result was in the upper area of the processing window by Okamura, which served as a guide. Accordingly, the blocking ring test was also carried ou. The test result was 0.4 cm, which indicated a low tendency

a Set flow test
b Measuring the diameter of the set flow test result
c Blocking ring test
d Concrete pouring into the mold
e Hardened concrete
f Group picture at the award ceremony



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d

to block. Based on these results of the fresh concrete, which are well suited for paving, the concrete was poured into the mold. The filling was done via a funnel through an opening with a diameter of 7 cm. The idea was to fill the funnel in such a way that the concrete always has enough pressure to flow. Unfortunately, this thought turned out to be unsuccessful, since the opening was only 5 cm high due to the narrow size and the shape closed with a pane. Subsequently, the filling hole was blocked when certain amount of concrete was poured. As a consequence, the mold could not be entirely filled up to the top.

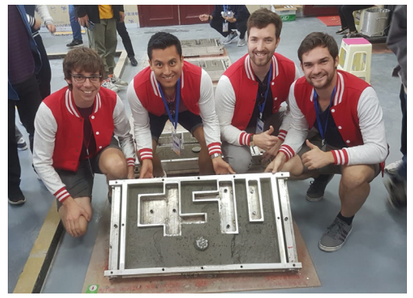
EVALUATION AND AWARD CEREMONY:

On Saturday (October 19th), the results of all groups were evaluated. First, all groups presented their approach and their mixed design. The judges then consulted and announced the results of the competition.

The filling capacity of the SVB was essentially considered in the assessment. However, since our concrete could not completely fill the mold, we only achieved a second place in the overall ranking behind the team from Thailand. With regard to the recipe, however, we achieved the best result because our concrete quality had the best values in terms of strength and homogeneity and at the same time we used the least additives.

The award ceremony took place on Sunday. All teams were honored and the champion teams of each task presented their results in the plenary. The awards for a second place were a certificate together with a trophy.

Author: Mirko Kiewning



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DAY 14 - CHANGSHA

Sunday, 20 October 2019
The last sunburn for this season!

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On Sunday (October 20th), we had to decide what to do in the morning on our own for the first time. Due to the unexpected situation of the competition, everyone was free to choose whether to go to the award ceremony or do something else on their own. The SVB team went to the award ceremony, some went to explore the city and others went jogging or just slept. We had a delicious lunch around 11.30 a.m. with many other participants of the competition in the hotel restaurant. Afterwards, we continued our sightseeing in a private bus. First we visited the Lucky Knot Bridge, which is on the "cover" of the excursion flyer and had accompanied us since the beginning of the excursion planning.
Then we went to the Fuyuan Bridge. Thanks to the nice weather, some of us used the opportunity to cool their feet on the river bank. The third bridge we visited was the Juzizhou Bridge, which connects the river bank with the famous orange island, one of Changsha's landmarks.

Since 2009, there has been a 32 m high granite statue of the young Mao Zedong, who lived in Changsha from 1912-1918 as a student, in the front part of the island. Mao Zedong was a Chinese revolutionary, politician and party leader who proclaimed the People's Republic of China in 1949 and led it until his death. We stayed there till the end of the day before heading back to the hotel.

Author: Mirko Kiewning

a Taking the "train" on Orange Island
b Statue of Mao Zedong
c Group picture on the Lucky Knot Bridge
d Lucky Knot Bridge

b

c

中国结步行桥

LUCKY KNOT BRIDGE

Footbridge
Max. Span: 185 m
Height: 24 m
Opening: October 2016

This spectacularly curved pedestrian bridge in the city of Changsha connects two river banks, streets and the parks. This bridge crosses the Dragon King Harbor River and is called the Lucky Knot Bridge.

In 2013, the planning for the Lucky Knot Bridge was started by the architecture firm NEXT architects and the structural engineering firm Capital Engineering & Research Incorporation Company ltd. After two years of construction, the bridge was opened in October 2016. The construction costs approximately 6.6 million euro. Its main span is 185 m and the highest point of the bridge is 24 m. The bridge offers pedestrians a fascinating view of the river, the surrounding mountains and the city. It is also a key project for the tourism development of the Meixihu area. As the name suggests, the design concept of the Lucky Knot Bridge is based on the Chinese lucky knot. In China, the color red and the knot itself stand for happiness and prosperity.

Author: Irina Müller

d

福元路大桥

FUYUAN BRIDGE

Arch bridge
Total length: 3575 m
Max. span: 188 m
Opening: 18 November 2012

Fuyuan Bridge is a bridge over the Xiangjiang River in Changsha, Hunan Province and connects the two districts: Yuelu and Kaifu. It is 3575 m long, 38.5 m wide and consists of three main steel arch fields as well as approach bridges with steel composite cross sections. The spans of the main bridge are 188 m - 22 m - 188 m - 22 m - 188 m. The steel arches have a box cross-section with a width of 2.2 m and a height of 3.2 m, which is inclined inwards by a degree of 12°.

The slab thickness of the steel cross section is 26 cm. The arches incline slightly inwards and are connected with seven cross bracing struts in the transverse direction of the bridge. The bridge deck is designed as a composite girder. It consists of two main beams with a height of 4.5 m each. The main girders are connected to the steel arches with ties. The pavement slab is made of reinforced concrete, it is 28 cm thick and was made with three precast slabs (one middle slab and two outer slabs). The ties of the bridge are made of high-strength galvanized steel cables, which run downwards parallelly in vertical direction. Each pier of the arch bridge is constructed as a V-shaped reinforced concrete structure, which is anchored in the ground using bored piles. To reduce the water flow, each pillar was designed to have a round cross-section.

The construction of the bridge started on September 27th, 2010 and the first pier of the approach bridges was built on December 19th. The first pier of the main bridge was built on September 2nd, 2011. Subsequently, the construction of the steel arches began on November 1st of the same year. The construction of the pavement deck started on May 11th, 2012. On November 18th, 2012, the bridge was completed and opened. The approach bridges were constructed with steel composite cross-sections, which consist of steel main girders and reinforced concrete carriageway slabs. These deck was manufactured using three precast slabs like the main bridges. The spans of the approach bridges on the western side and on the eastern side are 90 m - 85 m - 55 m and 60 m – 5 × 85 m - 90 m, respectively.

Author: Maximilian Küchler

a

b

a Fuyuan Bridge
b Support of the Fuyuan Bridge
c Juzizhou Bridge
d Juzizhou Bridge

c

橘子洲大桥

JUZIZHOU BRIDGE

Arch bridge
Total length: 1250 m
Opening: October 1972

Juzizhou Bridge is the first bridge built over the Xiang River and was completed in October 1972. Around 800.000 workers were involved in the construction of the bridge. At that time, there were little to no machinery in China, so everything had to be built by human labour. The structure of the Juzizhou Bridge is special because it is a two-way curved arch bridge with a total length of 1250 m. The loads are transferred in both longitudinal and transverse directions via reinforced concrete arches. In the longitudinal direction, the river is spanned with nine arches. Seven small arches can be seen in the transverse direction. The bridge received the first National Science and Technology Progress Award for its special structure design. The Changsha city government also declared it a historical monument.

The bridge connects downtown Changsha with the Yuelo District. In addition, the Juzizhou Bridge gives direct access to the approximately 5 km long so-called Orange Island and Juzizhou Park, which contains a 32 m high statue of the young Mao Zedong.

Author: Fabian Boße

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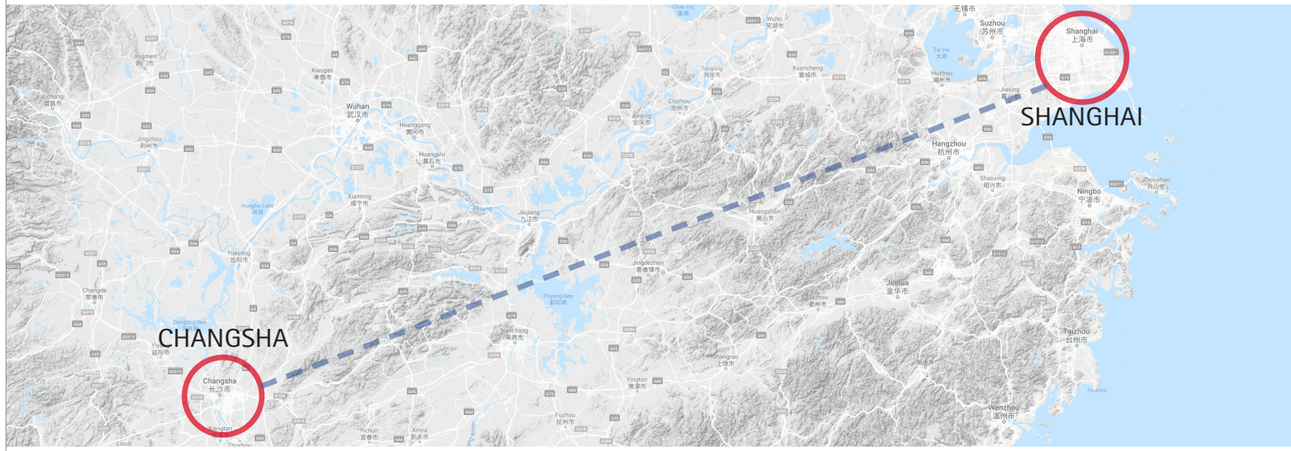


DAYS 15 - 16

CHANGSHA - SHANGHAI

21 - 22 OCTOBER 2019

DAY 15+16 - SHANGHAI

Monday, 21 October 2019
Tuesday, 22 October 2019

Chongjie! What are we gonna do without you??

a

We were already in front of the hotel in Changsha with packed suitcases at 7:30 a.m. to wait for our bus to the Changsha South Train Station, from where we took the train at 9:00 am to Shanghai. We expected a 6.5-hour train trip, during which many had the opportunity to recharge, to listen to music, to read or to write postcards.

When we arrived in Shanghai, we went to the "Dapuqiao market". Here we had the opportunity to get souvenirs. After a long walk through the colorful and narrow streets, we made our way to the restaurant. Although we had gotten used to the spicy food during these two weeks, it was still a challenge for the group this time. We had to choose the spiciest of the available dishes. After the spicy but delicious meal, we went to the Bar Rouge, where we spent our last evening in Shanghai together as a group, danced and looked back on the good times.

No activities were planned on the last day of the excursion and everyone was able to decide for himself or herself. Some of us went to the "Dapuqiao Market" again to get the last souvenirs. Others wanted to go to the Bund to take a last look at the impressive skyline of Shanghai and say goodbye to the city. Till and Mirko visited a Chinese barber shop to try a new haircut.
We met at 5 p.m. to have dinner together for the last time. Then we took the metro to the airport. We arrived at the airport at around 9:00 p.m. Since our flight to Munich started at 11:55 p.m., we had enough time to find what we were looking for in the DutyFree shops, for eample, to buy something to eat for the flight, or simply to prepare for the long-flight and wait for boarding.

On the plane, many of us took the opportunity to watch films, to listen to music or just sleep. When we arrived in Munich, we had to wait about three hours for our connecting flight.

The feeling that today was the last day can hardly be described in words ... Thank you for the great time, China!!

Author: Fernando André Lincango López

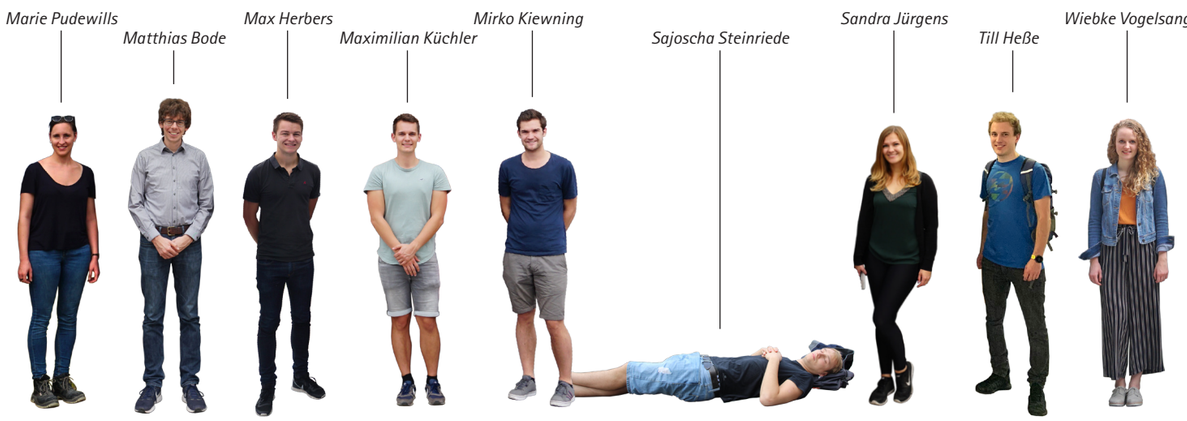
b

c

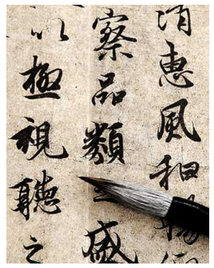
a Shanghai Skyline at night
b Dapuqiao Market
c Dapuqiao Market

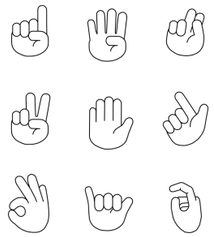
THE GROUP


Fernando André Lincango López
Chongjie Kang
Daniel Gebauer
Dean Lowles
Eike Schenk
Fabian Boße
Jan-Hauke Bartels
Irina Müller
Linda Bücking
Lisa Tielemann


Marie Pudewills
Matthias Bode
Max Herbers
Maximilian Küchler
Mirko Kiewning
Sajoscha Steinriede
Sandra Jürgens
Till Heße
Wiebke Vogelsang

IMPRESSIONS





THE CHINESE CUISINE

There are just as few Chinese cuisines as there are European cuisines. In China, there are eight main kitchens, which are named after the regions where they were developed: Lu, Chuan, Yue, Su, Zhe, Min, Xiang and Hui. Each kitchen contains dozens of specialties and hundreds of dishes. Similar to Europe, these styles have developed due to the different circumstances in the regions. They differ in the ingredients and cooking techniques.

During our excursion through China, we tried at least the Zhe, Chuan and Xiang kitchens. The dishes of the Zhe kitchen usually have a light taste with a slight sweetness. The dishes are often quite small and served in an appealing way. Chili is used in almost every dish in the Xiang kitchen. This makes the kitchen very spicy. In addition, the dishes are usually greasier and heavier than those in other regions. The Chuan kitchen is characterized by the use of zanthoxylum. It is also often spicy. Despite the differences in the individual kitchens, there are also many similarities. In China, you usually eat hot dishes, even for breakfast. The ingredients are cut into small pieces so that they can be eaten with chopsticks. As side dishes, there is either rice (south China) or noodles or other flour-made food (north China).

Eating together is also different from the way we eat in Germany. If you sit together in a group, usually one more dish than the number of people sit at the table is ordered or cooked. The dishes are then placed in the middle of the table and everyone can eat from any dish. Everyone has a small bowl and a pair of chopstickes to eat.

The most important thing in the end: “Cheers” means “Ganbei”!

Author: Chongjie Kang

DIE CHINESE LANGUAGE

Mandarin	836 Mio.
Wu	77 Mio.
Cantonese	71 Mio.
Min	60 Mio.
Jin	45 Mio.

Image source: literatpro.de; Author: Sophy Ru

We notice that Chinese native speakers tend to have difficulties with European languages. At first you may wonder and ask the question: Where does this come from? In particular English language seems very simple to us and is actually the standard language in international communication.

One explanation could be that the Chinese language follows a totally different system. If the written form of the language is rather unusual for us, the pronunciation is certainly also very different. In comparison, the Chinese grammar is much easier. It is not conjugated; there are no cases.

For example, in English it says:

„I was eating yesterday."
„I will eat tomorrow."

And in Chinese:

„I eat yesterday"
„I eat tomorrow"

Due to this background, it is easy to understand why our Chinese friends have difficulties with the European gramatical cases and the individual verb tenses.

In addition, in contrast to western languages, in which words are composed of letters, Chinese words are sometimes composed of several words. An example is the word "contradiction"(矛盾). It is composed of the word "spear" (矛) and the word "shield"(盾).

According to a rumor, this composition is based on a story: a trader sells a spear to a man and says: "This spear is the best I have ever built. He pierces every shield. "A little bit later, another man comes. The dealer told him: "This is the best sign I've ever made. He keeps every spear off." POW: contradiction!

Author: Daniel Gebauer

Image source: ebayimg.com

COUNTING WITH HAND SIGNALS

Another interesting striking thing about the meeting of our two cultures was the counting method by hand. In Germany we count by showing the number with the numbers of fingers. This is relatively easy and any combination is easy to understand. In contrast, in China the symbol of the number is imitated with the fingers. It becomes particularly exciting when the German tourist wants to order two dumplings by showing his thumb and index finger and then wonders how he could receive a bag with eight pieces of the corresponding delicacy in the end.

Incidentally, the hand signals are also not always the same in China, they differ sometimes in different regions. For example, the symbol for nine, as shown on the right, means seven in other regions. An alternative sign for ten is the crossing of the two index fingers. This again imitates the symbol of the number ten (十). If you master local customs in this regard, you will often get a surprised look and then a smile from the locals.

Author: Daniel Gebauer

Watch out for two and eight!

one 一 (yī)

two 二 (èr)

three 三 (sān)

four 四 (sì)

five 五 (wǔ)

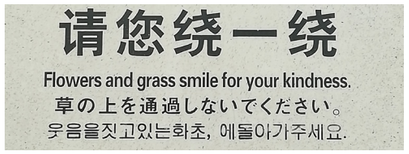
six 六 (liù)

seven 七 (qī)

eight 八 (bā)

nine 九 (jiǔ)

ten 十 (shí)



Not all mysteries could be solved during the excursion. About some things, we are still pondering...

Many thanks to the group for this great excursion and the unique experiences in China. Special thanks go to Daniel and Matthias for the organization and of course to Chongjie, without whom we would have been lost in China!

Wiebke Vogelsang

THANKS!
谢谢

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