# 中國優秀工程設計

## Excellent Project Designs of China

中華人民共和國建設部設計司主編

香港中國文化發展公司印制

# EXCELLENT PROJECT DESIGNS OF CHINA

# 儀征化纖工業聯合公司一期工程
# 總體及滌綸一廠設計

儀征化纖工業聯合公司是國家重點工程，我國最大的化纖聯合企業。工程總體設計及滌綸一廠設計質量好、速度快、投資省。滌綸一廠建設規模年產滌綸12萬噸、聚酯切片6.3萬噸，建築面積14.18萬平米，投資9.92億元。1984年12月建成投產，1988年9月竣工驗收。

工程總體設計合理，一次規劃分期建設工程銜接好。廠區總圖布置合理緊湊，功能分區明確，遠近期結合，公用工程緊靠負荷中心，運輸方式因地制宜，系統管綫短捷，節約能源，減少投資和占地面積。

產品方案和工藝路綫合理，引進聚酯裝置技術先進，自行設計的切片生產，攻克熔體夾套管設計技術難關，填補國內設計空白。聚酯裝置土建設計成功地采用天然地基，節省投資，加快工程進度。

以我爲主合作設計的紡織工藝和工程設計，具有世界規模和80年代先進水平；自行設計和首次采用的TDC—2000型紡絲機控制系統創國內先進水平。紡絲生產試車一次成功，產品質量優良，技術經濟指標達本行業先進水平，得到用户好評，企業經濟效益顯著。

國內配套工程和輔助生產設施設計技術先進合理，滿足生產要求。

該工程獲全國優秀工程設計金質獎。

Yizheng Joint Corporation of Chemical Fibre Industry is a key project of the state and is the biggest oint corporation of chemical fibre in China.

The overall corporation and No.1 Polyester Fibre Plant were well-designed with good quality, fast speed and economic investement. The construction scale of No.1 Polyester Fibre Plant for polyester fibre duction is 120,000T/Y with 63,000T/Y polyester chip production. The building area is 141,800M² with a total investement of 0.992 billion Yuan. The plant was put into operation in December, 1984 and was completed and passed state inspection in September, 1988.

The overall design of the corporation is reasonable with good coordination between the overall planning and construction at different phases. The general layout of the plant is both reasonable and compact with clear division of functional areas and fine combination of the present construction with future development. The utilities are close to consuming center. Transportation in line with local conditions and short pipeline system enabled it less energy consumption, less investement and land occupation.

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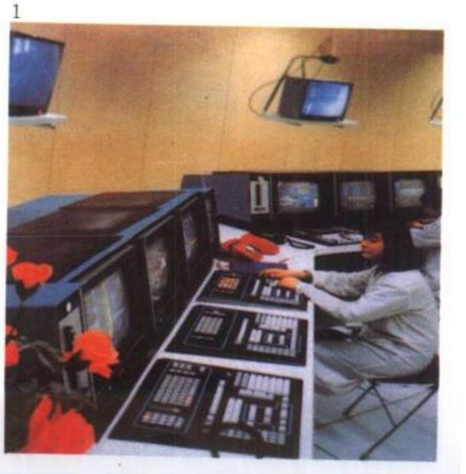

The production program and process route are rational. The imported polyester unit is of advanced technology. Self-designed chip production has solved difficulties in design of acketed molten polymer pipes, which has filled in the blank in domestic design. The natural foundation has been successfully used in the civil design of polyester unit, thus led to less investement and shorter engineering.

The spinning process and engineering design, mainly designed by ourselves through cooperation, is of world advanced level of the 80's. The self-designed TDC 2000 control system in use for the first time for spinning machine is of advanced level in China. The spinning production was sucessful at one trial. The products are of high quality and of advanced level of technical and economic standard of the trade and have received favourable comments from customers. The enterprise has achieved remarkable economic economic.

Advanced and appropriate design technique of domestic engineering and auxiliary facilities has enabled them satisfy production requirement.

The project has won Gold Medal in the 4th National Excellent Engineering Design.

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*Central Controt Room*
2.熱媒裝置
*HTM Unit*
3.滌綸一廠聚酯裝置
*Polyester Unit of NO.1 Polyester Fibre Plant*
4.儀征化纖工業聯合公司一期工程
*The fitst stage of Yizheng Joint Corporation of Chimical Fibre Industry*
5.滌綸一廠紡絲車間
*Spining Roon of NO.1 Polyester Fibre Plant*

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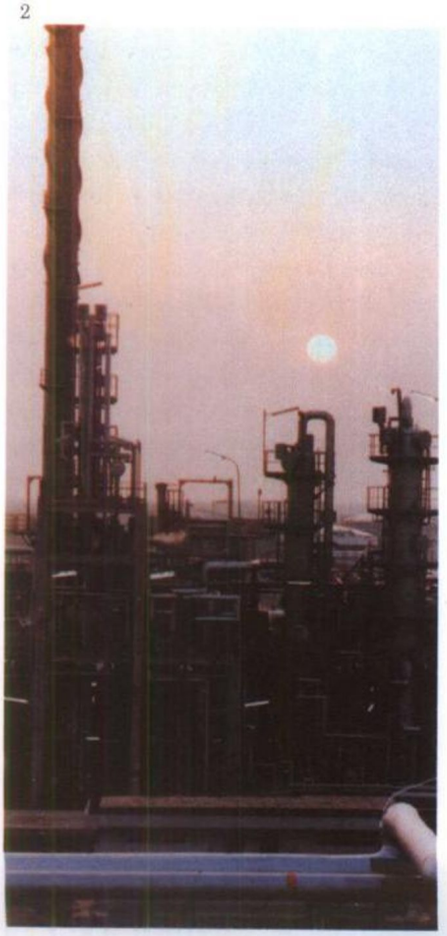

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# 保定化學纖維聯合廠
# 黏膠長絲擴建工程

該工程爲老廠擴建工程，建設規模年産2000噸粘膠長絲，建築面積3.2萬平米，投資6829萬元，1984年12月建成投産，1985年5月竣工驗收。

該設計充分利用原有設施和預留場地。布置緊凑合理，新老廠房結合較好。工程設計充分吸取老廠成功經驗，并加以多方面的改進提高，對提高産品質量、降低能耗、減少環境污染、改善車間勞動條件和防止建構築物腐蝕方面都取得明顯效果。

工藝設計和設備選型成熟可靠，采用中温老成、捏和式黄化、静止脱泡紡制中性絲并的工藝。絲并後處理采用壓洗，節省能耗，提高産品質量；酸浴蒸發回收，采用多級閃蒸裝置，節約蒸汽顯著；黄化機首次采用順序群控；紡絲機變頻電源，首次研制大功率晶閘管變頻設備，節電30％，降低噪聲；紡絲機含鋅去酸水分别回收處理，減少污染；改進紡絲車間空調設計大大改善勞動條件。

該設計榮獲第四届全國優秀工程設計金質獎。

The project is an extension of the existing factory. It was designed to have an annual production of 2000 tons of viscose filament yarn, 32,000 $M^2$ of construction area and total investement of 68,290,000 Yuan. The project was put into operation in December 1984 and was completed and passed state acceptance in 1985.

The existing facilities and the reserved area have been fully utilized in the design with compact and reasonable arrangement and better combination of the old and new buildings. The engineering design has obtained successful experience from the existing factory and made improvements in many respects. Remarkable Progress have been achieved in improving product quality, lowering energy consumption, reducing environment pollution, improving working condition and in preventing the corrosion of building and structures.

The process design and equipment selection are mature and reliable. The medium temperature aging, the kneading xanthation, the production of neutral spin cake by static deareation rpocess have been adopted. for spin cake aftertreatment, the pressure washing is used so that the energy consumption is saved and production quality is enhanced. The multi-stage flash unit is used for the recovery of acid bath evaporation with remarkable steam saving. For xanthating machine, the sequence control in group is used for the first time. Big powered thyristor frequency converter has been initially produced for power supply of frequency converter of spinning machine which has saved 30% electricity consumptionand has reduced noise pollution. The zino contented de-acid water are recovered and treated separately, so that the pollution has been decreased. The renovation of the design of air conditioning in the spinning room has sufficiently improved working conditions.

The design has won Gold Medal in the 4th National Excellent Engineering Design.

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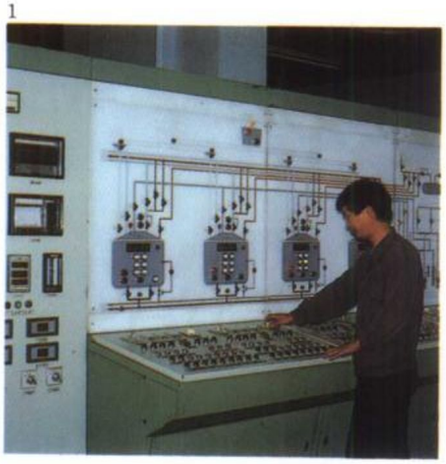

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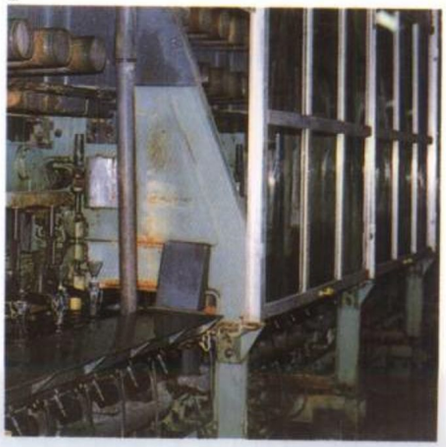

1.黄化機程序控制
*Program Control of Xanthating machine*

2.粘膠長絲紡絲車間一角
*A Corner of Viscose Filament Production Workshop*

# YARN IN BAODING CHEMICAL FIBRE FACTORY

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3.絲并壓洗機

*Pressure Washing of spinn cake for after-treatment*

4.紡絲機靜態變頻裝置

*Static Frequency Converter for Spinning Machine*

5.長絲絡筒車間

*Filament Winding workshop*

6.保定化纖廠。右側爲擴建的粘膠長絲車間。

*Baoding Chemical Fibre Factory*

*Right: Extended Viscose Filament Plant*

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# 上海針織工業大樓

上海針織工業大樓工程
*The project of the Textile Industry Bui-lding, Shanghai.*

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上海針織工業大樓的設計是貫徹執行了黨中央和上海市委“發展輕紡工業要走技術改造內涵的道路”、“老廠技術改造要和城市改造相結合”的方針，以及上海紡織產品要積極“向外擠”的要求，把過去分散的與居民住宅毗鄰的上海針織一廠、上海針織二廠合建于上海針織四廠廠址內的上海針織工業大樓中，改變了過去廠房簡陋，工廠與居民混雜，生活條件差以及三廢無法治理的局面。三家工廠合資經營了三聯綜合服務公司，負責承擔三家工廠的生活、醫療等項目，使生活服務社會化，爲上海針織行業老廠技術改造找到了一個新的模式。該工程以八十年代先進水平爲目標而設計，適應外向型生產要求，產品打入美、日和西歐等世界市場。該設計的特點是:生產立體化、專業化;生活社會化;場地緊凑、布局合理化。該工程由上海紡織工業設計院設計。1987年獲得紡織工業部優秀工程設計一等獎，同年又獲得上海市優秀設計一等獎。1989年獲得全國優秀工程設計銀質獎。

The design of Shanghai Knitting Industry Mansion was in accordance with the guiding principles of "developing light and textile industry through technical renovation", "combining technical renovation of the old enterprises with urban renewal" and the principle of "actively promoting Shanghai textile products to the world market" formulated by the Central Committee and Shanghai

# SHANGHAI KNITTING INDUSTRY MANSION

Municipal Committee.

The project plans to move both the Shanghai First Knitting Factory and the Shanghai Second Knitting Factory, which used to be scattered in residencial areas into Shanghai Knitting Industry Mansion which was located in the site of the Shanghai Fourth Knitting Factory. After the remove, buildings are no longer simple and poor; factory and inhabitation are no longer interlaced; living conditions get better and wastes can be treated. The three factories jointly run a general service coporation responsible for living and clinic items and made living service socialized . This creates a new model of technical reformation of old knitting enterprises.

The design aimed to attain 80's advanced level and adapts to export-oriented production. the products sell far and broad to U.S.A., Japan, West Europe, etc. worldwide markets.

The features of the design are: high-rised factory building, specialized production, socialized environment living, compact but reasonable layout. The Design won the First Award of Excellent Design by Ministry of Textile Industry in 1987, the same year won the first award of Distinguished Design of Shanghai, and also won the Sliver Prize in the Fourth National Excellent Design in 1989.

It was designed by the Shanghai Design Institute for Textile Industry.

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# 北京至秦皇島鐵路電氣化工程

京秦電氣化鐵路復綫正綫裏程341公里，首次引進AT供電方式。自行研究開發的各項新技術符合國情，達到八十年代初國際水平。設計方案、技術標准及設備選型均屬先進，是我國目前技術最先進，供電質量最高，事故率最低的區段，得到了廣泛的好評，推動了我國鐵路電氣化的技術進步。

京秦電氣化鐵路的特點是：

運能大(年運量可達6200萬噸)，供電質量高，投資少(較BT供電方式少投資2500—3000萬元)，采用主變壓器固定備用、變電所自動裝置、微機運動裝置、接觸網硬横梁及3噸系懸掛方式等新技術，大大提高了供電可靠性及生産管理效率。輸油管道及無綫防護方面采用了自己的科研成果及措施，大量壓縮遷改工作量，節約投資1400余萬元。

目前該鐵路已達到初期運量(約爲4000萬噸)，在大秦鐵路Ⅱ期工程没有通車前，承擔大秦鐵路Ⅰ期工程運量，保證晉煤外運國家計劃的完成。

該項工程由鐵道部電氣化工程局電氣化勘測設計院、通信信號勘測設計院設計。

The Beijing-Qinhuangdao electrified railway line, a main trunk of 341 km double-track line, has introduced AT feeding system for the first time. All the new technologies developed are in accorded with China's context and also, reached the international level of the eighties. The design layout, technical standards and equipment choice are up-to-date. It shows through operation that both financial result and social benefit have been achieved. It has been highly praised for its up-to-date technology, optimum quality of power supply and minimum faiture rate comparing with the rest electrified lines, pushing forward the technical progress of China's railway electrification.

The features of the Beijing-Qinhuangdao electrihied railway line are describd as follows:

It provides large freight turnover (yearly bing up to 62 million tons), high quality of power supply and low cost (of about 25-30 million Yuan less than that for BT feeding system); It adopts certain new technologies, such as stationary stand-by for main transformers, automatic devices for substations, micro-computer remote-control installations, portal structure and 3-ton (total tension) overhead contact line, etc, having obviously enhanced the reliability of power supply and efficiency of production control. Our newly-developed technologies and measures are utilized in oil-transfering pipe run and reduction of interference with telecommunication lines. It saved over 14 million Yuan investmeat as a result of greatly cutting down the reconstruction work.

At present, the freight turnover of this line has been raised to the expected primary level of about 40 million tons, carrying the freight turnover of the first-stage project of Datong-Qinhuangdao railway line until the second-stage project is completed and open to traffic, in order to ensure the practice of the state schedule of the Shanxi coal transport.

It was designed by Reconnaissace and Design Institute & Reconnsisance and Telecommunication and Signal Design Institute under the Electrification Engineering Bureau of the Ministry of Railways

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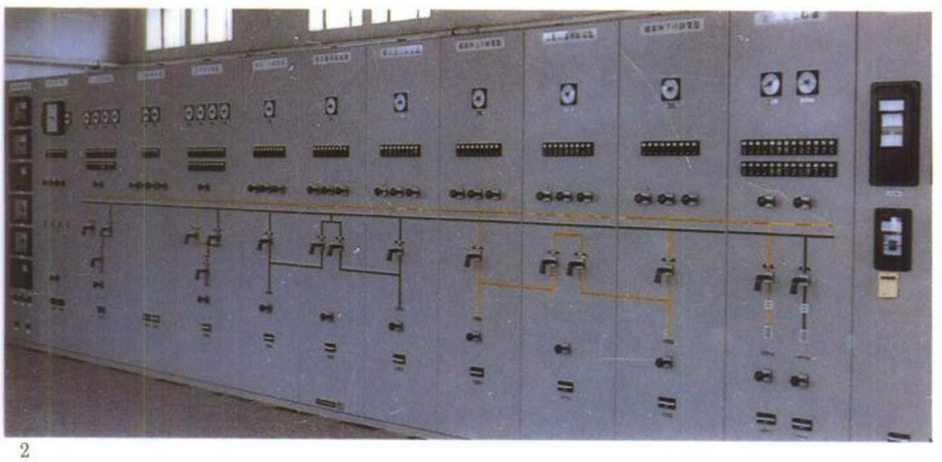
# BEIJING-QINHUANGDAO RAILWAY LINE ELECTRIFICA TION PROJECT



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1.微機運動裝置控制中心
*The Contsol Centse of the micio-Computes semote-Contiol installation*

2.變電所自動裝置
*The automaticdexices for sueitations*

3.新型腕臂支持裝置
*The new supponents*

4.硬橫跨支持裝置
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*The one of electiic eugetations*

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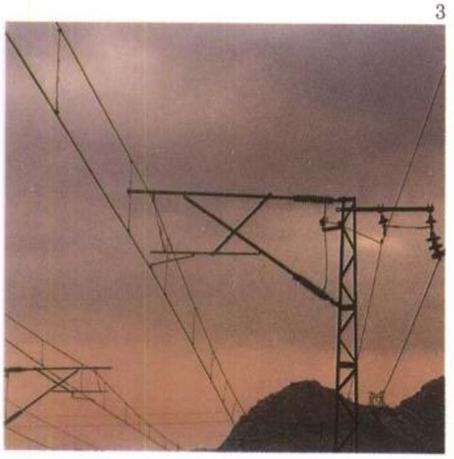

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# 梧桐山公路隧道勘測設計

梧桐山公路隧道位于深圳市羅芳橋至沙頭角一級公路上。隧道全長:2322米，采用雙管四車道，爲我國目前公路隧道最長、設備最齊全、自動化程度最高的一級公路隧道。

該工程由鐵道部隧道工程局勘測設計院承擔勘測、設計及該局第三工程處擔負施工及設備安裝。該工程于1985年10月開工，1987年9月27日建成通車。1988年榮獲深圳市十大建設成就獎、鐵道部優質工程(甲級)獎、鐵道部優秀設計二等獎，國家優秀工程設計銀質獎。

該隧道采用復合式支護結構型式，拱部加設整體式鋼筋砼吊板，設置送、排風道，兩洞口端加設遮陽棚，上行隧道采用全横向式通風，下行隧道采用半横向式通風，于隧道中部加設通風竪井2座，構成6條通風渠道，匯集于4座風塔排、送。

隧道設供電、照明、滅火裝置、閉路電視、交通信號、廣播、火灾手動及自動報警、通信、收費及CO、VI計自動測定并傳輸到中控室自動啟、閉風機，自動調節葉片，使風機運轉處于最佳狀態。

中控室將各種監控系統綜合到中央控制臺，再配合模擬屏顯示各種設備運轉情况和行車情况。

1.隧道曲綫段

*Curved Line Section of the Tunnel*

2.梧桐山隧道出口端

*Eastern Portal of the Wutong Mourtain Highway Tunnel*

The Wutong Mountain Highway Tunnel is on the Luofang Bridge to Shatoujiao class-A highway in Shenzhen. The total length of the tunnel is 2322m. Currently this 4-lane twin-tunnel is the lognest, best equipped and most highly automatized class-A hghway tunnel in China.

Reconnaissance and design for the tunnel were carried out by Reconnaissance and Design Institute of Tunnel Engineering Bureau, Ministry of Railways, PRC. Construction and equipment installation of the tunnel were undertaken by the 3rd Construction Division under the same bureau. The work was started in Oct. 1985 and open to traffic on Sept. 27,1987. In 1988, the engineering was awarded severial prizes i.e. the Ten--Large-Construction Prize of Shenzhen, the Silver Prize of National Excellent Engineering, the Luban Prize, the Prize of Excellent Engineering (class-A) by the Ministry of Railways, the Prize of the 2nd-class Excellent Design by the Ministry of Railways.

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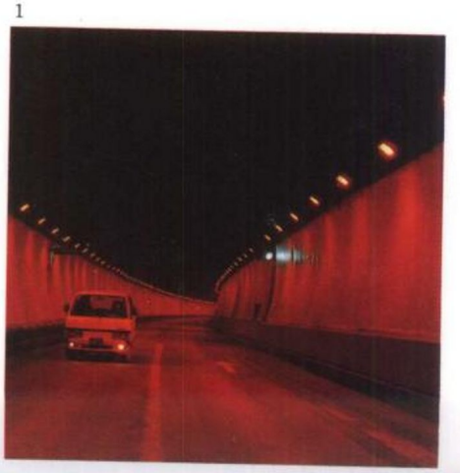
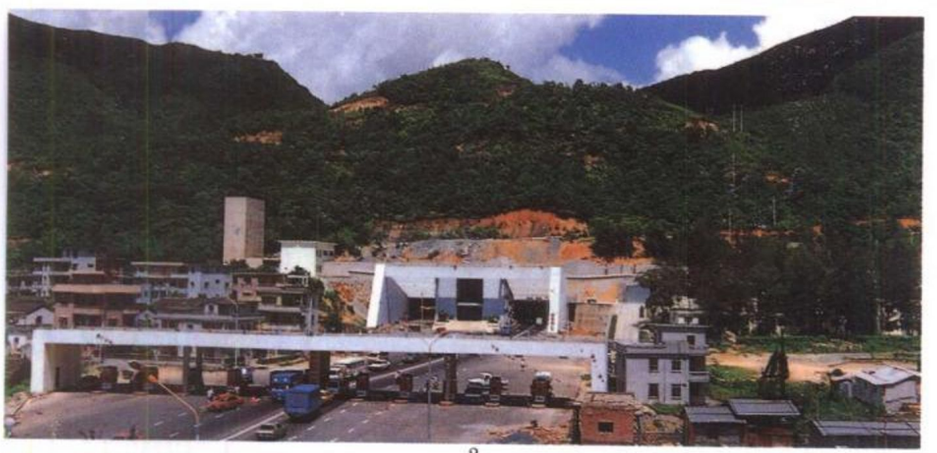


Composite support structure was adopted for the tunnel. The integrated R.C, partition ceiling was placed in the tunnel roof to provide air supply and/or exhaust ducts. Sunscreens were added at the both end portals. The transverse system was selected for the ventilation of the up-running tunnel and semi-transverse system for hte down-running one. Two intermediate ventilation hsafts were designed on the tunnel line to garm into 6 ventilation ducts and to supply and exhaust by 4 ventilation towers.

Safety and Monitoring System: The tunnel is equipped with power supply, lighting, fire-extinguishing facilities, ccty, traffic signal, broadcast, hand-operated and automatic fire-alarming, communication, toll gate and CO meter and VI meter, which automatically transmit the measured data to the central control room where they will switch on/off the ventilators, adjust the blades automatically so as to enable the ventilators' operating in an optimal state.

In the central control room, all kinds of monitoring systems are controlled on the central control desk with an analog panel to display the various equipment's operations as well as the traffic situation.

# WUTONGSHAN HIGHWAY TUNNEL



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3.隧道施工,四臂臺車作業。

*Tunnel Construction ,4-boom jumbo in operation*

4.隧道直綫段

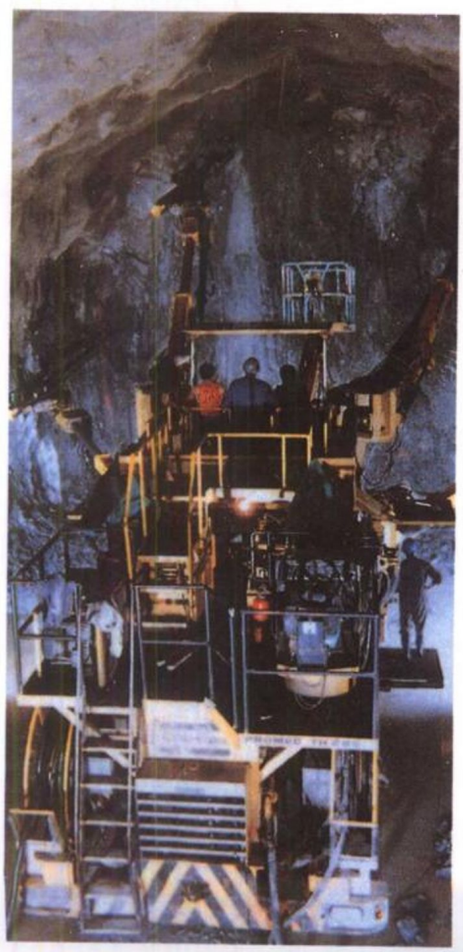
*Straight Line Section of the Tunnel*

5.照明燈、非常電話、攝像機、CO計、VI計、消火栓。

*Illuminaite ,Emergence Telephone ,Caera , VI meter, CO meter, Fite Hydrant*

6.中央控制室

*Central Control Room*



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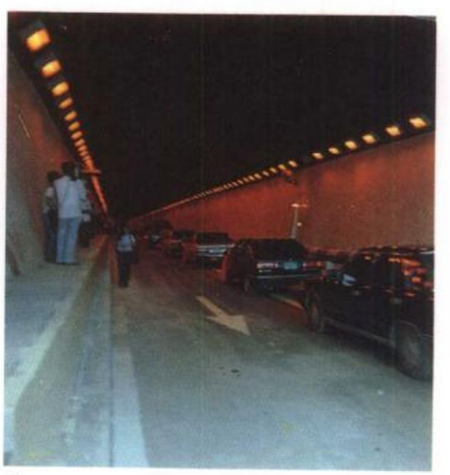

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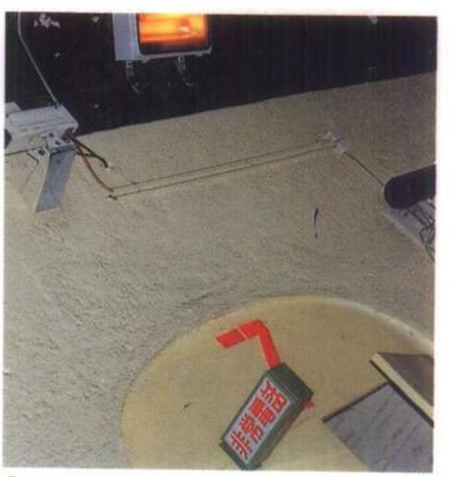

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# 新荷鐵路長東黃河大橋

新鄉—菏澤鐵路長東黃河大橋在豫魯兩省交界的長垣縣和東明縣境內跨越黃河，全長10.282公里，是我國目前最長的單綫鐵路橋梁。從西往東由121孔32.0米預應力混凝土簡支梁、100孔40.0米鋼板梁，9孔96.0米簡支鋼桁梁、4×108.0米和3×108.0米連續鋼桁梁各一聯和19孔32.0米預應力混凝工簡支梁組成。在121孔32.0米預應力混凝土簡支梁段還設置了到發綫有效長度爲1050米的會讓站，縮短了運行區間的距離，使運輸能力提高了20%。

該橋從結構方案上看，着重于用較短工期得以建成。爲此，有約55%的橋長采用鋼梁結構，其余的45%爲廠制整體運装的預應力混凝土簡支梁，使現有各廠家在生産能力上能保證預制梁的供應，實現了短工期通車的目標。除連續鋼桁梁的橋墩采用沉井基礎之外，其余一律爲鑽孔灌注樁基礎，樁總長達6萬余米，其量之大爲歷史上所罕見。爲適應黃河水流多變，采用了圓形墩身的鋼筋混凝土結構，節省了混凝土用量，壓縮了對砂石的需求。以上這些措施使該橋得以在一年半時間内建成通車。

大橋的設計單位爲鐵道部大橋局勘測設計院。

The yellow Riour Major Bridge on the Xinxiang-Heze Railway Line crosses the yellow River within the boundaries of Changyuan and Dongming counties at the juncture of Henan and Shandong provinces. Total length of the bridge is 10.282 km. The bridge, conveying a single track, is currently the longest railway bridge in China. The superstructure is, from west to east, made up of 121 spans of 32 meter simply supported P. C. T-beams, 100 spans of 40 meter steel plate girders, 9 spans of 96 meter simply supported steel trusses, 4x108.0 meter and 3x108.0 meter steel continuous trusses, 1 unit for each, and 19 spans of 32 meter simply supported P.C. T-beams. Within the section of the 121x32.0 meter simply supported P.C. T-beams, a station with 1050 meter station track is set up on the bridge to shorten the running distance. Consequently the transport capacity is increased by 20%.

The structural scheme of the bridge concentrated on the completion of the project in a short time limit. For this reason, steel girder and truss structures are and used for about 55% of the length of bridge, the remainder 45% are of simply supported P.C. T-beams, which are shop precast, and delivered and hoisted intergrally. Shop prefabrication of beams made the existing plants able to ensure beam supply at their productive capacities. As a result, the goal of open to traffic in a short time limit was achieved.

All foundations of the bridge are of cast-in-place drilled piles, except that open caissons are used as foundations for the steel continuous trusses. The accumulated length of drilled piles reached 60,000 meters, which is a large quantity of its kind rarely encountered in engineering works before. In order to suit the changeable current direction of the river, round R.C. pier shafts are adopted. This shape also led to economization in concrete, and needs of sand and coarse aggregate were thus reduced. The aforementioned measures together enabled the bridge to be completed and open to traffic in only a halh and one year.

The bridge was designed by the Reconnaissance and Design Institute of the Major Bridge Engineering Bureau of the Ministry of Railways.

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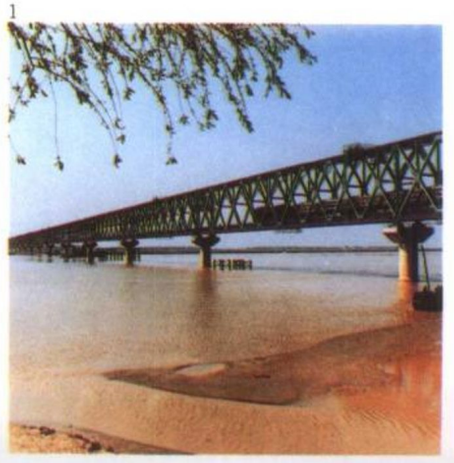
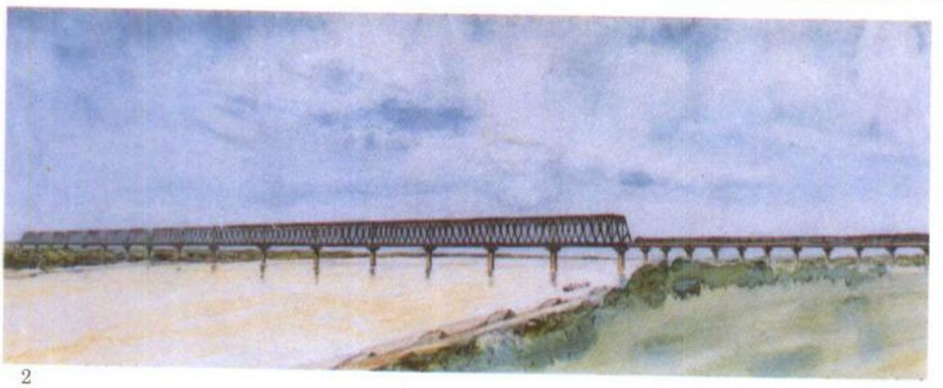


1.長東黃河大橋主孔108.0m連續鋼桁梁

*The 108m main-span continuous steel trusses of Chang-Dong Yellow River Bridge*

# BRIEF INTRODUCTION OF THE BRIDGE ACROSS THE YELLOW RIVER BETWEEN CHANGYUAN AN DONGMING COUNTIES



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2.從東側看長東黃河大橋全景

*A general view from the east of Chang-Dong Yellow River Bridge*

3.長東黃河大橋橋上會讓站部份

*The wait-for-passing station on approach aection*

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# 石臼港煤碼頭工程

石臼港新建10萬噸級煤碼頭工程是國家"六五"期間重點建設項目，設計年吞吐量1500萬噸。是我國第一座完全開敞式的碼頭，兩側均可停靠10萬噸級煤船。碼頭水深爲—17.0米，碼頭全長452米，由5個靠船墩和5個系船墩組成，碼頭與引堤之間用轉向平臺和全長1144米的鋼棧橋連接。煤碼頭由圓沉箱墩、大跨度的鋼結構和後張預應力梁組成。裝船機軌道梁首次采用熱噴鋁加封閉塗料箱型鋼梁。煤堆場可堆存120萬噸煤，由卸車和取料裝船兩個系統組成裝卸工藝。兩泊位配備2臺高效率移動旋轉式裝船機(6000噸/小時)，卸車采用2臺串聯回轉雙翻式翻車機，自動化程度高，卸車效率30次/小時。采用行之有效的干式和濕式除塵措施，控制煤塵污染達到國家標准。該工程由交通部第一航務工程勘察設計院勘察設計。獲全國優秀設計金質獎。

The new 100,000 ton coal terminal of Shijou Port is one of the state key construction projects for the Sixth-Five-Year Plan, with the designed annual capacity of 1500,000 tons. It is the first full opensea terminal designed in China.

It runs for a distance of 452M along with the water depth of -17.0M and is able to serve a 100,000DWT coal carrier on either side of it. It consists of five berthing dolphins and five mooring dolphins. The berths are connected to the leading pier by means of a turning platform and a steel jetty in length of 1144M. In addition, they are constructed with circular caissons, wide-span steel structures and poststressed beams.

It is the first time in China to apply hot sprayed aluminium plus sealed coat steel box beams to the rail beams for the shiploader. The coal storage yard can hold 1200,000 tons of coal. The entire handling flow includes two systemsie, car unloading and reclaiming-shiploading systems. The two berths are provided with two highly efficiency travelling-slewing type shoploaders (with capacity of 6,000t/hr each). For the car unloading operation, two reverse tandom car dumpers are used with highly automatic function and capacity of 30 cycles/hr. For this terminal, the pratical and functional dust collecting and water spraying measures are taken to control coal dust up to the national standard.

The project was designed by the lst Design and Sarvey Institute of Navigational Engineering of the Ministry of Communications.It was awarded the Golden Prize in the 4th National Excellent Design.

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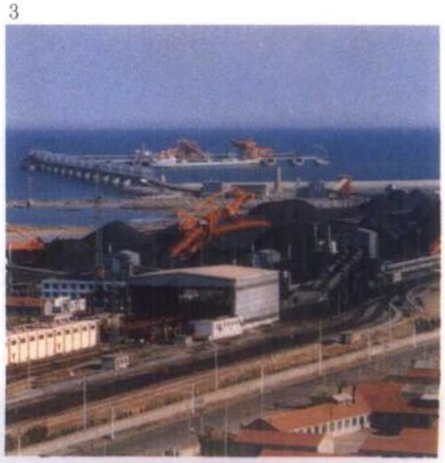

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1.移動旋轉式裝船機(6000噸/小時)
*Traxelling-slewing type shiploader (6000t/hr)*

2.翻車機系統(由定位車、推車機、翻車機等組成)
*Car dumping system (including the positioner, indexer ,car dumper ,etc.)*