



Rating  
**Buy**

Asia  
China

Industrials  
Manufacturing

Company  
**CRCC High-Tech**

Reuters 1786.HK    Bloomberg 1786 HK    Exchange HSI    Ticker 1786

Date  
24 June 2016

## Initiation of Coverage

Price at 24 Jun 2016 (HKD)	3.44
Price target - 12mth (HKD)	5.62
52-week range (HKD)	4.90 - 2.98
HANG SENG INDEX	20,868

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## Well positioned in a niche market; initiating with Buy

### A global leader in large railway track maintenance machinery market

In our view, strong earnings momentum for CRCC High-Tech Equipment (CRCCE) will be driven by strong market demand for large railway track maintenance machinery and overhaul services, benefiting mainly from the continued expansion of rail networks, substitute effects and new market exploration. We expect CRCCE's net profit to register an 18% CAGR in 2016-18. We initiate on CRCCE with a Buy rating and a target price of HK\$5.62, implying upside potential of 63%.

### Capacity expansion and leading technology to capture demand

We forecast an 11% CAGR in Chinese large rail track maintenance equipment investment in 2016-2018, driven by the continued expansion of the network and the increasing application of machinery to replace manual labour. We believe CRCCE should benefit from tapping into new markets (e.g. rail power supply market). We forecast a 20% CAGR in domestic overhaul service demand in 2016-2018, as more rail track maintenance machinery will be due for overhaul after its 10-13 years of service. CRCCE expects its production capacity to rise by 100 units up until end-2017, to 486 units. We believe CRCCE should maintain its dominance in China, given its sizable capacity, comprehensive portfolio, leading technology and high industry barriers.

### Healthy earnings outlook supported by margin expansion and solid order flow

We forecast CRCCE to report an 18% net profit CAGR, on the back of a 13% revenue CAGR, for 2016-18. Its backlog at the end of March 2016 was c.Rmb2.7bn (Rmb2.4bn at end-2015), and 90%+ will be recognised as sales in 2016, on our estimates. We expect more orders in 2H16. The product mix upgrade and better economies of scale should support margin expansion. We forecast its GPM to rise to 24.5% in 2018 from 24.0% in 2015. In addition, we expect the administrative expenses to sales ratio could decline gradually.

### Initiating with Buy and a DCF-based target price of HK\$5.62; risks

We use DCF as our primary tool to value CRCCE. Our target price is HK\$5.62, based on a WACC of 10.56% and TGR of 1%. This implies a 2017E PER of 11.5x, in line with its Chinese peers. We think this makes sense, given CRCCE offers stronger earnings growth than its peers, which is likely to be offset by a smaller market capitalisation and shorter track record as a listed entity. Downside risks: high dependence on CRC and lower government spending.

#### Forecasts And Ratios

Year End Dec 31	2014A	2015A	2016E	2017E	2018E
Sales (CNYm)	3,476.7	3,973.1	4,420.5	4,922.4	5,614.2
Reported NPAT (CNYm)	354.9	456.2	533.0	620.4	736.0
DB EPS FD(CNY)	0.36	0.45	0.35	0.41	0.48
DB EPS growth (%)	-	25.6	-22.3	16.4	18.6
PER (x)	-	8.6	8.3	7.2	6.0
Yield (net) (%)	-	6.1	2.4	2.8	3.3

Source: Deutsche Bank estimates, company data

<sup>1</sup> DB EPS is fully diluted and excludes non-recurring items

<sup>2</sup> Multiples and yields calculations use average historical prices for past years and spot prices for current and future years

#### Price/price relative



Performance (%)	1m	3m	12m
Absolute	-14.6	-14.2	-
HANG SENG INDEX	5.2	2.6	-23.9

Source: Deutsche Bank

#### Stock data

Market cap (HKDm)	5,228
Market cap (USDm)	674
Shares outstanding (m)	1,519.9
Free float (%)	35

Source: Deutsche Bank

Deutsche Bank AG/Hong Kong

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Model updated: 24 June 2016

Fiscal year end 31-Dec

2014 2015 2016E 2017E 2018E

Running the numbers

Asia  
 China  
 Manufacturing

CRCC High-Tech

Reuters: 1786.HK Bloomberg: 1786.HK

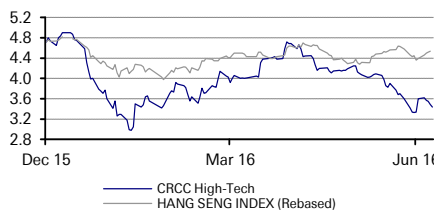
Buy

Price (24 Jun 16) HKD 3.44  
 Target Price HKD 5.62  
 52 Week range HKD 2.98 - 4.90  
 Market Cap (m) HKDm 5,228  
 USDm 674

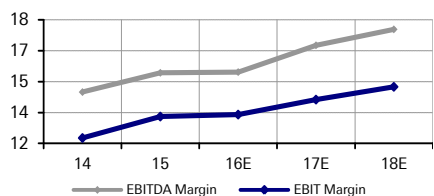
Company Profile

CRCC HTE was the largest railway track maintenance machinery manufacturer in Asia and the second-largest player globally in terms of sales revenue of large railway track maintenance machinery in 2015. CRCC HTE's business segments are: manufacturing and sales of machines, parts and components sales and services, overhaul services, and railway lines maintenance services.

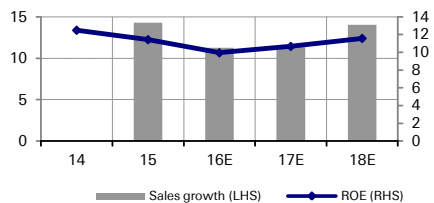
Price Performance



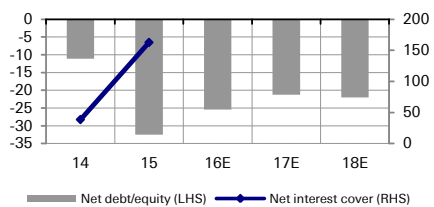
Margin Trends



Growth & Profitability



Solvency



Financial Summary

DB EPS (CNY)	0.36	0.45	0.35	0.41	0.48
Reported EPS (CNY)	0.36	0.45	0.35	0.41	0.48
DPS (CNY)	0.07	0.24	0.07	0.08	0.10
BVPS (CNY)	2.9	3.4	3.7	4.0	4.4
Weighted average shares (m)	988	1,011	1,520	1,520	1,520
Average market cap (CNYm)	na	3,929	4,437	4,437	4,437
Enterprise value (CNYm)	na	2,257	3,021	3,150	2,972

Valuation Metrics

P/E (DB) (x)	na	8.6	8.3	7.2	6.0
P/E (Reported) (x)	na	8.6	8.3	7.2	6.0
P/BV (x)	0.00	1.14	0.80	0.73	0.67
FCF Yield (%)	na	nm	nm	nm	7.3
Dividend Yield (%)	na	6.1	2.4	2.8	3.3
EV/Sales (x)	nm	0.6	0.7	0.6	0.5
EV/EBITDA (x)	nm	3.7	4.4	3.8	3.0
EV/EBIT (x)	nm	4.3	5.1	4.5	3.6

Income Statement (CNYm)

Sales revenue	3,477	3,973	4,421	4,922	5,614
Gross profit	896	1,038	1,163	1,334	1,535
EBITDA	504	613	684	825	985
Depreciation	70	70	91	130	157
Amortisation	8	15	0	0	0
EBIT	427	529	593	696	828
Net interest income/(expense)	-11	-3	20	18	18
Associates/affiliates	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0
Other pre-tax income/(expense)	0	0	0	0	0
Profit before tax	416	526	613	713	846
Income tax expense	54	70	80	93	110
Minorities	7	-1	0	0	0
Other post-tax income/(expense)	0	0	0	0	0
Net profit	355	456	533	620	736
DB adjustments (including dilution)	0	0	0	0	0
DB Net profit	355	456	533	620	736

Cash Flow (CNYm)

Cash flow from operations	-278	-509	520	560	630
Net Capex	28	-33	-670	-565	-305
Free cash flow	-250	-543	-150	-5	325
Equity raised/(bought back)	0	2,252	0	0	0
Dividends paid	-70	-368	-107	-124	-147
Net inc/(dec) in borrowings	-783	0	0	0	0
Other investing/financing cash flows	-230	4	0	0	0
Net cash flow	-1,333	1,345	-257	-129	178
Change in working capital	-731	-1,027	-104	-190	-262

Balance Sheet (CNYm)

Cash and other liquid assets	321	1,673	1,416	1,287	1,465
Tangible fixed assets	1,011	947	1,526	1,961	2,110
Goodwill/intangible assets	3	18	18	18	18
Associates/investments	0	0	0	0	0
Other assets	2,896	4,100	4,186	4,541	5,034
Total assets	4,230	6,738	7,146	7,807	8,627
Interest bearing debt	0	0	0	0	0
Other liabilities	1,341	1,596	1,577	1,742	1,973
Total liabilities	1,341	1,596	1,577	1,742	1,973
Shareholders' equity	2,840	5,142	5,568	6,065	6,654
Minorities	49	0	0	0	0
Total shareholders' equity	2,889	5,142	5,568	6,065	6,654
Net debt	-321	-1,673	-1,416	-1,287	-1,465

Key Company Metrics

Sales growth (%)	nm	14.3	11.3	11.4	14.1
DB EPS growth (%)	na	25.6	-22.3	16.4	18.6
EBITDA Margin (%)	14.5	15.4	15.5	16.8	17.5
EBIT Margin (%)	12.3	13.3	13.4	14.1	14.8
Payout ratio (%)	19.7	52.4	20.0	20.0	20.0
ROE (%)	12.5	11.4	10.0	10.7	11.6
Capex/sales (%)	0.9	0.9	15.2	11.5	5.4
Capex/depreciation (x)	0.4	0.4	7.3	4.4	1.9
Net debt/equity (%)	-11.1	-32.5	-25.4	-21.2	-22.0
Net interest cover (x)	38.8	162.9	nm	nm	nm

Source: Company data, Deutsche Bank estimates

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# Investment thesis

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## Outlook

### CRCCE well positioned to benefit from strong demand

We estimate that the Chinese large railway track maintenance equipment industry should post a 10.4% CAGR in 2015-18, to Rmb4.8bn, following the completion of an increasing number of railway infrastructure projects (mainly for those railways with a ballast track bed) in the past few years and substitution (application of machinery to replace manual labour). We believe CRCCE should also benefit from tapping into new markets (e.g. rail power supply maintenance, urban rail transit and ballastless tracks). We forecast that Rmb2.3bn will be spent on overhaul services in 2016-18 (vs. Rmb969m in 2013-15), implying a 19.8% CAGR for 2015-18. We believe CRCCE is well positioned to benefit from this growth, driven mainly by: 1) its market leadership in the growing Chinese large railway track maintenance machinery industry, 2) capacity expansion, 3) a comprehensive portfolio, and 4) leading technology that can enhance its competitiveness and help it capture demand.

### Healthy earnings outlook supported by margin expansion and solid order flow

We estimate CRCCE to report a 17% net profit CAGR, on the back of a 12% revenue CAGR, for FY15-18. CRCCE's backlog at the end of March 2016 was c.Rmb2.7bn (Rmb2.4bn at end-2015), and more than 90% will be recognised as sales in 2016E. We expect more orders in 2H16. We forecast CRCCE's gross margin to increase to 24.2-24.5% in 2016-18, from 24.0% in 2015, on business/product mix upgrades. We expect sales from the high-margin overhaul service business to account for 14% of total sales in 2018, compared with 11% in 2015. Meanwhile, management expects to sell more high-margin track maintenance machinery and new products, which will benefit its profitability, in our view. We expect that the administrative expenses (excluding R&D expenses) to sales ratio could decline, with better expense control, which is line with management guidance. In addition, CRCCE's growth potential in overseas markets, rising replacement demand and positive government policies could drive the company's long-term growth.

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## Valuation

We use DCF as our primary tool to value CRCCE, with reference to a relative valuation based on P/E multiples. Our target price is HK\$5.62, based on a WACC of 10.56% and terminal growth rate of 1%. This implies a 2017E PER of 11.5x, in line with its Chinese peers. We think this makes sense, given CRCCE offers stronger earnings growth than its peers, which is likely to be offset by a smaller market capitalisation and shorter track record as a listed entity.

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## Risks

Key risks include: 1) a high dependence on CRC (China Railway Corporation), 2) lower government spending on railway projects, 3) a sharp increase in the price of raw materials and components, 4) F/X fluctuations, 5) weaker demand from overseas markets, and 6) any significant changes to its long-term relationship with Plasser & Theurer.



# Valuation

## DCF-based target price of HK\$5.62; initiating with Buy

We initiate coverage on CRCCE with a Buy rating and a 12-month target price of HK\$5.62. Our primary valuation methodology for CRCCE is a DCF analysis (WACC of 10.56%, China country level COE of 9.5%, beta of 1.25, COD of 5.0% and ND/E of 5%), with 2020 as the terminal year and a 1% terminal growth rate. We use higher beta of 1.25 for CRCCE than CRRC and Zhuzhou CRRC (0.9), mainly reflecting its shorter track record as a listed entity and smaller market capitalisation vs. peers. CRCCE's terminal growth rate is in line with CRRC (the largest Chinese rolling stock producer). However, it is lower than that of Zhuzhou CRRC (2%), as Zhuzhou CRRC can enjoy higher earnings growth, mainly benefitting from strong demand from the non-railway business and gaining more market share in the domestic market on the back of the CSR/CNR merger. CRCCE's terminal growth outperforms that of railway constructors (0.5% for CRCC and CRG, under our coverage), reflecting mainly the more solid demand growth for large railway track maintenance machinery that we expect in the long term, supported by rail network expansion and manual labour substitution. Our target price implies 11.5x 2017E P/E, in line with Chinese peers.

Figure 1: Discounted cash flow analysis

31 December (Rmb m)	2016E	2017E	2018E	2019E	2020E
EBIT	593	696	828	941	1,025
-less tax on EBIT	77	90	108	118	128
Effective tax rate	13%	13%	13%	13%	13%
Change in working capital	(104)	(190)	(262)	(234)	(155)
Add depreciation and amortisation	91	130	157	175	194
-less capex	670	565	305	305	305
FCF	(167)	(20)	310	460	631
Terminal value					6,667
FCF + TV	(167)	(20)	310	460	7,298
No. of years discounted		1	2	3	4
Discount factor (x)	1.00	1.11	1.22	1.35	1.49
NPV	<b>(167)</b>	<b>(19)</b>	<b>253</b>	<b>340</b>	<b>4,884</b>
<b>Enterprise value</b>	<b>5,460</b>				
Less net debt (end-FY16E)	(1,716)				
<b>Equity value (Rmb)</b>	<b>7,175</b>				
<b>Equity value (HK\$m)</b>	<b>8,544</b>				
End-16 issued shares (m)	1,519.9				
<b>Equity value per share (HKD)</b>	<b>5.62</b>				
Implied PE (2017E)	11.5				
Implied PB (2017E)	1.2				

Source: Deutsche Bank estimates



Figure 2: WACC assumptions

Risk-free rate - China	3.9%
Equity risk premium - China	5.6%
COE – Deutsche Bank's country COE for China	9.5%
Beta	1.25
Cost of equity	10.9%
Cost of debt	5.0%
Effective tax rate (long-term)	25%
Target debt ratio	5%
<b>WACC</b>	<b>10.56%</b>

Source: Deutsche Bank estimates

## Relative valuation

### Major peers are not currently listed

The company's major domestic peers (Gemac Engineering Machinery, Beijing Feb.7<sup>th</sup> Railway Transportation Equipment, and Baoji CSR Times Engineering Machinery) are not currently listed. Among the major global peers, only Harsco is listed in the US. However, Harsco had only 10-15% of total sales from the railway track maintenance machinery business in 2013-15.

### The closest comparables for CRCCE are CRRC, Zhuzhou CRRC and CRSC

In our view, the closest comparables for CRCCE are CRRC (1766.HK), Zhuzhou CRRC (3898.HK) and CRSC (3969.HK), given that all these companies belong to the China railway equipment industry and are leaders in their respective sub-sectors. CRRC is the largest rolling stock producer in the world. Zhuzhou CRRC is the largest power converter system (for rolling stock) manufacturer in China. CRSC is the largest signalling system producer for rolling stock in China. CRCCE is the largest railway track maintenance machinery producer in China.

Since listing in Hong Kong last December, CRCCE's share price has declined 33% (vs. a 4% drop for the HSI Index, a 6% decline for Zhuzhou CRRC, a 2% decline for CRSC and a 28% drop for CRRC). This underperformance is mainly due to market concerns about the railway equipment investment outlook in 2016-2017. However, we believe the concerns for CRCCE may be overdone and the recent decline in the share price is excessive, as the railway track maintenance machinery outlook is likely to be better than that for rolling stock, due to limited impact from weak cargo traffic. We forecast railway equipment investment (mainly EMU, freight wagons, locomotives and passenger carriages) to drop 4% in 2016 and have no growth in 2017-2018, whilst the Chinese large railway track maintenance equipment industry should post a 10% CAGR in 2015-18.

Based on our earnings forecasts, we find CRCCE's current valuation undemanding at 7.3x 2017E PER, lower than its local peers' average of 11.3x, based on Bloomberg consensus and our own forecasts (Figure 3). We view this discount as too wide, given the more attractive earnings growth we expect for CRCCE. We suggest that investors Buy this stock, given its dominant market position, healthy earnings outlook, strong cash position and cheap valuation.

In terms of P/B valuation, CRCCE trades at 0.7x 2017E, which looks unjustified by a similar ROE compared to peers. We forecast CRCCE's ROE to be 11% in 2017, vs. 12-14% for CRRC and CRSC.

Figure 3: Global rail equipment peer comparison

Company name	Bloomberg	Curr	DB rating	Price	Market cap	Ave trading value	P/E (X)			EPS Chg(%)			P/B (X)			ROE (%)		
23 June 2016	Ticker			(local)	(US\$ m)	(US\$ m)	FY16E	FY17E	FY18E	FY16E	FY17E	FY18E	FY16E	FY17E	FY18E	FY16E	FY17E	FY18E
<b>CRCC High-Tech Equipment</b>	<b>1786 HK</b>	<b>HK\$</b>	<b>n/a</b>	<b>3.49</b>	<b>684</b>	<b>1</b>	<b>8.4</b>	<b>7.3</b>	<b>6.1</b>	<b>-22%</b>	<b>16%</b>	<b>19%</b>	<b>0.8</b>	<b>0.7</b>	<b>0.7</b>	<b>10.0</b>	<b>10.7</b>	<b>11.6</b>
<b>Chinese producers</b>																		
CRRC Corp *	1766 HK	HK\$	Hold	6.83	35,276	21	12.6	11.5	n/a	9%	9%	n/a	1.4	1.3	n/a	11.9	11.8	n/a
Zhuzhou CRRC Times Electric Co., Ltd. *	3898 HK	HK\$	Buy	42.65	6,447	15	14.6	12.9	n/a	11%	13%	n/a	2.7	2.3	n/a	20.3	19.5	n/a
CRSC Corp	3969 HK	HK\$	n/a	4.97	5,566	2	11.2	9.5	8.6	-5%	18%	11%	1.5	1.3	1.2	13.7	14.2	14.6
Hollysys Automation Technologies	HOLI US	USD	n/a	18.49	1,079	6	10.0	9.3	8.9	12%	8%	4%	1.6	1.4	1.3	17.3	16.4	15.4
<b>Average for Chinese peers</b>							<b>12.1</b>	<b>10.8</b>	<b>8.8</b>	<b>7%</b>	<b>12%</b>	<b>7%</b>	<b>1.8</b>	<b>1.6</b>	<b>1.2</b>	<b>15.8</b>	<b>15.5</b>	<b>15.0</b>
<b>Average for Chinese peers (excluding Hollysys)</b>							<b>12.8</b>	<b>11.3</b>	<b>8.6</b>	<b>5%</b>	<b>13%</b>	<b>11%</b>	<b>1.9</b>	<b>1.6</b>	<b>1.2</b>	<b>15.3</b>	<b>15.2</b>	<b>14.6</b>
<b>International producers</b>																		
Alstom	ALO FP	EUR	n/a	21.85	5,400	32	n/a	18.3	13.2	n/a	n/a	39%	2.0	1.4	1.3	81.0	5.1	8.4
Ansaldo STS	STS IM	EUR	n/a	10.08	2,274	4	21.4	20.2	19.4	0%	6%	4%	2.9	2.6	2.4	13.9	13.6	n/a
Bombardier	BBD/B CN	CAD	n/a	1.98	3,515	31	n/a	n/a	20.2	n/a	n/a	n/a	n/a	n/a	n/a	12.8	2.5	(5.3)
General Electric Company *	GE US	USD	Hold	31.19	286,813	1,185	20.9	18.1	16.0	14%	15%	13%	2.6	n/a	n/a	11.7	n/a	n/a
Harsco Corp	HSC US	USD	n/a	6.99	560	7	23.3	15.5	n/a	275%	50%	n/a	n/a	n/a	n/a	8.3	10.6	n/a
Kawasaki	7012 JP	JPY	n/a	328.00	5,052	61	12.1	11.9	10.8	-12%	1%	10%	1.2	1.2	1.1	10.4	10.5	10.6
Nabtesco Corp	6268 JP	JPY	n/a	2,651.00	3,140	24	18.5	16.5	16.0	2%	12%	3%	2.2	2.1	1.9	12.2	12.1	11.9
Mitsubishi Electric *	6503 JP	JPY	Buy	1,307.00	26,334	96	12.6	13.2	11.8	-3%	-7%	12%	1.4	1.4	1.3	12.4	11.1	11.5
Hyundai ROTEM	064350 KS	KRW	n/a	18,350.00	1,337	4	82.8	51.5	39.0	n/a	61%	32%	1.1	1.1	1.1	1.4	2.0	2.8
Siemens	SIE GY	EUR	n/a	97.76	93,732	288	14.3	13.0	11.7	21%	10%	12%	2.2	2.1	1.9	15.1	15.1	16.0
<b>Average for International peers</b>							<b>25.7</b>	<b>19.8</b>	<b>17.6</b>	<b>43%</b>	<b>19%</b>	<b>16%</b>	<b>1.9</b>	<b>1.7</b>	<b>1.6</b>	<b>17.9</b>	<b>9.2</b>	<b>8.0</b>
<b>Overall average</b>							<b>21.2</b>	<b>17.0</b>	<b>16.0</b>	<b>30%</b>	<b>16%</b>	<b>14%</b>	<b>1.9</b>	<b>1.6</b>	<b>1.5</b>	<b>17.3</b>	<b>11.1</b>	<b>9.5</b>

Note: Kawasaki Heavy Industries, Nippon Sharyo, Nabtesco, Mitsubishi Electric: year to March; Bombardier: year to January;  
Source: Deutsche Bank estimates for companies with \*\*, Bloomberg Finance LP estimates for all others





# Risks

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## Lower railway investment

Government spending directly affects the expansion of the railway network in China. CRC (China Railway Corporation) holds its annual work meeting at the beginning of every year. A lower budget might reduce the level of railway construction activity and, in turn, adversely affect demand for large railway track maintenance machinery, given the slower expansion of the railway network.

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## High dependence on CRC

According to CRCCE, revenue from its largest customer, CRC, and its affiliated enterprises amounted to more than 85% of the company's total revenue from its manufacturing and overhaul businesses in the past three years. If CRC and/or any of its affiliated enterprises materially reduce, revise, delay, or cancel their orders with CRCCE, the company might not be able to obtain similar replacement orders from other customers. This would have substantial negative implications for CRCCE's business and financial condition.

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## High dependence on major suppliers

CRCCE's purchase costs attributable to its five largest suppliers represented around 59.1%, 49.3% and 55.1% of its total purchase costs during 2013-15, respectively. Its purchase costs attributable to its largest supplier represented around 20.4%, 17.9% and 18.8% of total purchase costs during the same period. Any adverse changes in the relationship with these major suppliers or failure to receive products in time could cause unfavourable results to CRCCE's manufacturing operations and financial situation.

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## Significant changes to long-term relationship with Plasser & Theurer

CRCCE entered into various long-term cooperation agreements, principally of a term of 13 years, with a manufacturer of large railway track maintenance machinery, Austria-based Plasser & Theurer (the "Key Cooperation Partner"), under which the Key Cooperation Partner has licensed CRCCE certain of its intellectual property rights and technologies and to manufacture and sell selected types of large railway track maintenance machines. Plasser & Theurer ranked No.1 in the world, in terms of 2015 sales revenue. CRCCE had 40 types of large railway track maintenance machines, among which 13 types were licensed machines. Revenue from these machines accounted for 36-60% of CRCCE's total sales in 2012-2015. According to the agreement, CRCCE may not export the licensed machines to restricted countries that were specified in the agreement. In the meantime, CRCCE also agreed to purchase an aggregate value of parts and components used in the manufacture of the licensed machines from the Key Cooperation Partner.

If the Key Cooperation Partner ceases to supply CRCCE with the parts and components necessary for the manufacture of the licensed machines, or if



CRCCCE's relationship with the Key Cooperation Partner is terminated or the Key Cooperation Partner terminates CRCCCE's licence to use its intellectual property rights and technologies and for the production and sale of the licensed machines, CRCCCE might need to adjust its production plans to manufacture alternative products with parts and components from alternative suppliers.

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## A sharp increase in raw material and component prices

Raw materials and components account for 77-80% of CRCCCE's production costs. Raw material and component price hikes would hurt margins if CRCCCE were not able to fully pass them on to customers or offset them by better economies of scale and an increased localisation ratio. CRCCCE's major suppliers might also raise their prices for some key components that are hard to replace by other suppliers.

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## FX fluctuations

Although CRCCCE currently generates most of its revenue from China, it purchases some parts and components from overseas suppliers (accounting for 40% of total raw material and components costs). Its overseas supply contracts are generally in Euro or USDs (mainly denominated in Euro). As a result, fluctuations in FX rates, particularly between the Rmb, Euro and USD, could increase the company's purchase costs and hurt its profitability. A 5% Euro appreciation would lead to a 4% decrease in CRCCCE's 2016 net profit, on our estimates (all else being equal).

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## Payment delays by customers

For the large railway track maintenance machinery sales and overhaul business, CRCCCE usually asks customers to make a prepayment of 10-30% of the total contract value upon confirmation of their order. The remaining payment is received at the time of delivery. For sales of parts and components, prepayment is usually not applicable. CRCCCE may experience delays or defaults in accounts receivable by its customers, which could adversely affect its cash flow and working capital, as well as its financial conditions and operating results.

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## Weak overseas demand

Although CRCCCE's revenue contribution from the overseas markets is not significant, its products are actually exported along with services offered by railway construction companies such as CRG and CRCC. These construction companies' businesses might be negatively affected by economic, political, and social conditions outside the PRC. In 2015, sales from railway construction companies accounted for around 10% of CRCCCE's total revenue from manufacturing and sales of machines. The recent economic slowdown in most emerging countries (many of which are the major customers of the construction companies) might delay the pace of railway construction and reduce the scale of relevant orders for CRCCCE. Meanwhile, existing industry standards that differ from those in the PRC and entry barriers in certain developed regions may limit CRCCCE's opportunities in those markets.



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## Uncertainty in entering new businesses

CRCCE intends to extend its manufacturing and sale of its machine business with new products in railway power supply, high-speed railways without ballast track beds and urban rail transit systems. Lower-than-expected demand from new businesses could be a drag on its overall operating results. In addition, failures in R&D and the launch of new products could undermine CRCCE's ability to meet customers' needs and maintain its market-leading position.



# Industry outlook

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## Key points

- The expansion of China's rail network, the increasing application of machinery to replace manual labour and new markets (such as railway power supply maintenance, subway and ballastless tracks) will support healthy demand for large railway track maintenance machinery, in our view.
- Overhaul services should see rapid expansion, as many existing machines will enter their overhaul periods in the coming years.
- Favourable government policies and overseas markets could provide growth momentum in the long term.

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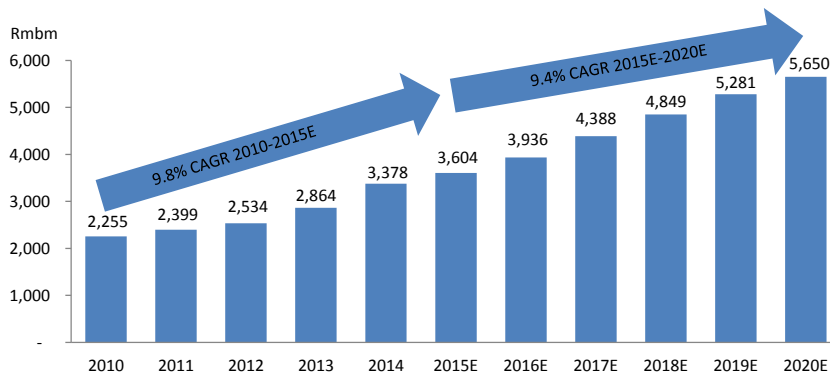
## Healthy demand for large railway track maintenance machinery in China

Before 1990, China's railway track maintenance work mainly involved manual labour. Large railway track maintenance machinery was introduced into China for the first time from overseas. Since 1988, the domestic manufacturing of large railway track maintenance machinery, led by CRCCE, has been launched and developed. The industry has seen rapid growth since 2006, when the Chinese government started to ramp up railway transportation infrastructure to solve traffic bottlenecks and support economic growth.

According to China Insights Consultancy ("CIC", a third-party consulting company), the market size of large railway track maintenance machinery in China recorded a CAGR of 9.8% during 2010-15. We believe demand for large railway track maintenance machines will continue its healthy growth in 2015-20, due to 1) the continued expansion of China's rail network (mainly for those railways with a ballast track bed), 2) the increasing application of machinery to replace manual labour and more frequent maintenance needs from healthy traffic growth, and 3) exploration of the urban rail transit market and railways without a ballast track bed (mainly high-speed railway lines with an operational speed above 250km/h). Overall, we forecast that the market size of large railway track maintenance machinery (excluding urban rapid transit vehicles, which we will discuss later) in China will register a CAGR of 10% from 2015 to 2020 (Figure 4).



Figure 4: Market size of China's large railway track maintenance machinery industry



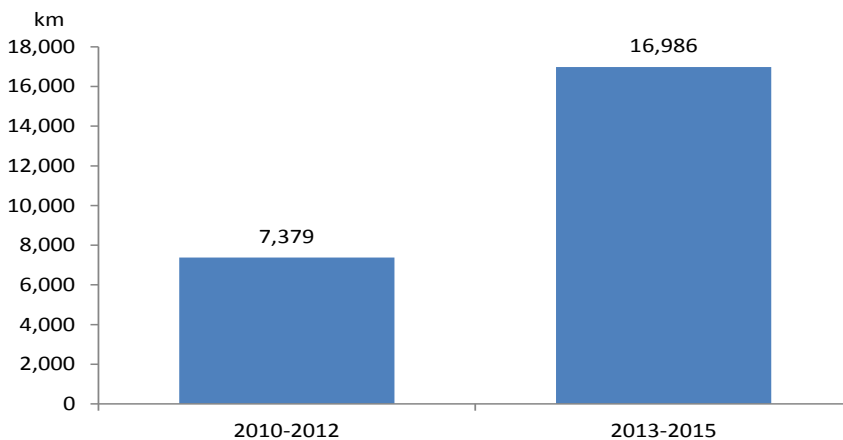
Source: China Insights Consultancy, Deutsche Bank estimate

We identify the following drivers:

**Driver #1: continued expansion of China's railway network with ballast track**

CRCC's products are used mainly on railways with ballast (broken rocks placed on road beds, bridges, tunnel floors and between railway sleepers and tracks to fix the track, sustain weight and reduce traffic-induced noise) track beds. Large railway track maintenance machines are needed for both existing lines and newly-built lines. According to management, c.80% of CRCC's demand comes from the maintenance of existing lines, which started after 0.5-3.5 years of operation depending on different operating speeds and annual gross traffic tonnages. Around 17,000-km ballast tracks were completed during 2013-15, based on our estimates, more than doubling from c.7,400 kilometres in 2010-12. We believe the burst in newly-launched ballast tracks in the past three years will drive better demand for railway track maintenance machinery (CRCC's core products) in 2016-18.

Figure 5: Newly-launched railway length with ballast track bed in China



Source: Deutsche Bank estimates, CRC

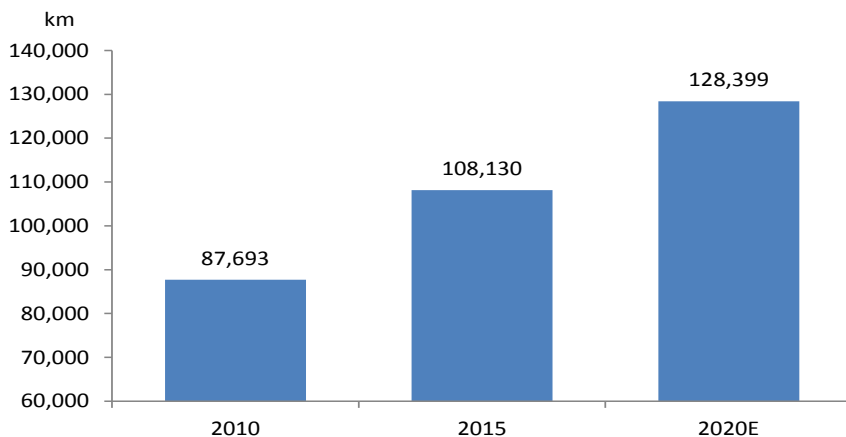
Meanwhile, demand from newly-built ballast track railways should remain stable. From 2016 to 2020, we expect newly completed national railway



lengths with ballast track beds to increase by 20,000km+ (vs. 20,000km+ during 2011-15).

Overall, demand for the company's major products should see solid growth in the next few years and remain stable in the longer term during their maintenance period, in our view.

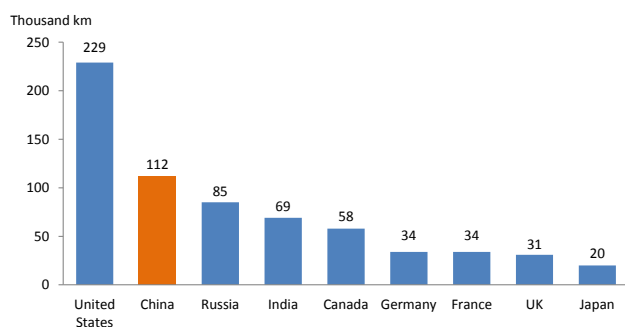
Figure 6: Operating railway length with ballast track bed in China



Source: Deutsche Bank estimates, CRC

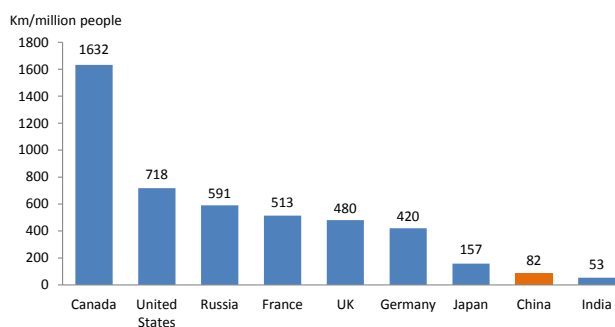
Looking ahead, we expect railway lengths to continue to grow after 2020, given that China's railway penetration is still low. China's rail density stood at 82km/million people at end-2014, less than half of the global average. The pipeline for new rail projects is still large. According to a work conference of the National Railway Administration, local governments have submitted railway plans with a total length of 69,000km and a total investment cost of Rmb7tr for the next five years (source: Caixin). We believe railway networks are still far from complete in central and western China, while plans for intercity railway networks have just started in eastern China. Parallel lines may be built to upgrade operating speeds or divert heavy traffic in some regions. Cargo and mixed lines will also contribute to the plan.

Figure 7: Operation mileage of railways in major countries (at end-2014)



Source: World Bank, CRC, NBS, China Insights Consultancy

Figure 8: Rail density in major countries (at end-2014)



Source: World Bank, CRC, NBS, China Insights Consultancy

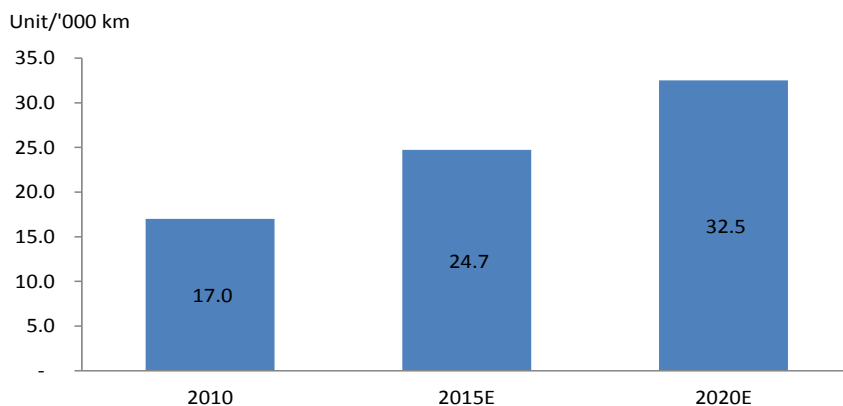


### Driver #2: rising substitution of manual labour

According to the National Railway Administration (NRA) of the PRC, at the end of 2015, China's operating railway length reached 121,000km, the second-longest operating railway length in the world. Besides incremental demand from newly-launched lines after 2013, we believe demand for large railway track maintenance machinery from existing lines before 2013 will also rise. According to estimates from CRCCE, less than 50% of existing lines are now covered by large railway maintenance machinery in China. More than 50% of existing lines are still dependent on manual labour and small railway maintenance machinery for track maintenance. We expect the application of machinery to replace manual labour, owing to rising labour costs and the increased requirements for work efficiency and safety.

The installed volume of large railway track maintenance machinery in China stood at 24.7 units per thousand kilometres in 2015, and we expect this figure to reach 32.5 units in 2020.

Figure 9: Installed volume of large railway track maintenance machinery in China



Source: CRC, China Insights Consultancy, Deutsche Bank estimates

### Driver #3: exploration of new markets

**a) Railway power supply market.** CRCCE's major products have so far been concentrated mostly in railway engineering work (mainly railway track and bed maintenance). Going forward, we believe more business opportunities will come from the field of railway electricity work (mainly railway power supply inspection and maintenance), as the latest policy has guided that the comprehensive use of advanced large equipment should be covered on all railway lines in the next 15 years (source: CRCCE). Currently, most railway lines are still dependent on manual labour and small machinery for power supply maintenance.

On 17 December 2015, CRCCE announced an Rmb528m new contract of 22 catenary inspection and maintenance vehicles (high-end equipment, also known as "high-speed rail ambulances") from CRC, representing c.25% of its backlog amount at end-2015. The unit selling price of this product is around Rmb24m, beating most of its traditional products. CRCCE delivered this product (seven units) for the first time in 2015, contributing to substantial sales growth in the other machinery segment.



By the end of 2015, the length of the electrified railway network in China was more than 74,000km (source: NRA). According to CRCCE management, every 100-kilometres of electrified railway in Germany is equipped with one catenary inspection and maintenance vehicle, which could be translated into demand for 700+ units for the current electrified railway network in China. Compared with less than 100 units ordered by CRC so far (only 12 units were delivered by 2015, and at least 72 units will be delivered in 2016-17), incremental demand for this product should be one of the key drivers in the next few years.

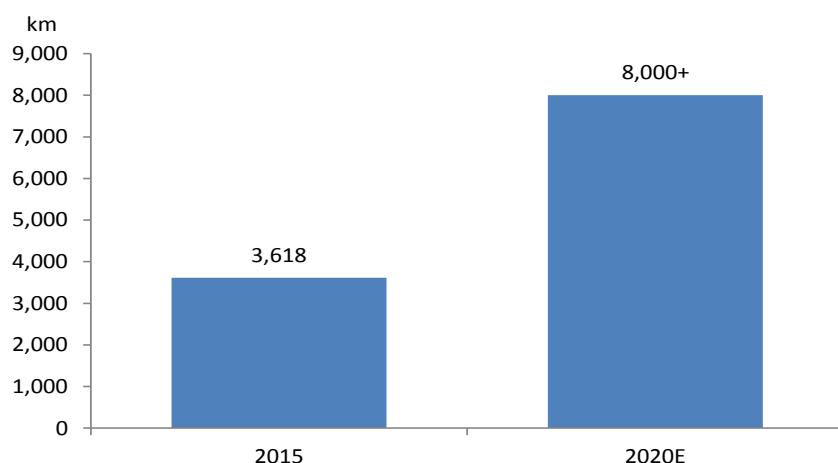
CRCCE regards itself as one of the few qualified manufacturers of catenary inspection and maintenance vehicles, which could help it grow in this rapidly expanding market. For this product, we forecast CRCCE's sales volume to record a 23% CAGR during 2015-20, implying a 7% contribution to total revenue (compared with 4% in 2015).

**b) Urban rail transit.** With the accelerating progress of urbanisation in China, urban rail transit systems are playing a more important role in public transportation, owing to their large capacity, punctuality, low levels of pollution, and reduced land usage. The density ratio of China's urban rail transit is much lower than in other countries, implying strong growth potential. According to the China Association of Metros, urban rail transit lines in operation across 26 cities in China had amounted to 3,618km by the end of 2015. NDRC estimates that the rapid transit network length in China will increase to over 8,000km by end-2020.

So far, management has guided that subway track maintenance relies mainly on manual labour. However, with the increased labour costs, we see rising demand for large rail track maintenance machinery from urban rail transit in the future. In 2015, CRCCE won its first orders in urban rail transit systems from the Shanghai, Beijing and Kunming subway companies with high-ASP steel rail milling and grinding machines (Figure 20 and Figure 36). Shanghai and Beijing had the most developed urban rail transit systems and the longest operating length to be maintained as at end-2015. Meanwhile, many other domestic peers have introduced subway standards from these two cities. Therefore, we believe the company is well positioned to explore the nationwide urban rail transit maintenance market and develop more customised products with its advanced experience in large subway track maintenance machinery. The company is also developing new products for ballast tracks of subways in some ground sections.



Figure 10: Urban rail transit network length in China



Source: China Association of Metros, NDRRC

**c) Ballastless tracks.** The advantages of ballastless tracks include enabling high-speed, high-carriage capacity, smooth and stable railway operations, a long service life and durability, and low maintenance requirements. Ballastless track technology is used widely in high-speed railways in China.

Based on our estimates, the length of railway lines without ballast track beds in China was around 13,000km at the end of 2015 (mainly high-speed railway lines with an operational speed of above 250km). Large railway track maintenance machinery from ballastless track bed railway lines are mainly rail processing machines (such as rail milling machines) and machinery for track bed maintenance (such as track snow/sand removers). With the increased operation time on these high-speed lines, we believe demand for large railway track maintenance machinery from these lines could rise in the long run.

CRCCE has guided that the market for railway power supply and urban rail transit system maintenance is still in its beginning stage and that its products are used mainly on railways with ballast track beds. Hence, we believe there is great potential for large rail track maintenance machinery in the three markets (railway power supply, urban rail transit and railway ballastless tracks) in the medium to long term.

## Strong growth in the overhaul service

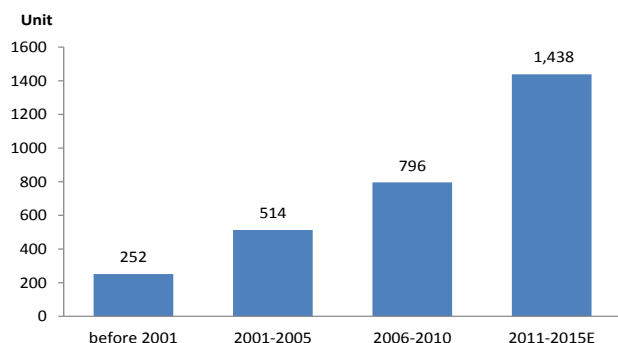
In 1989, CRCCE sold China's first large railway track maintenance machine. Demand started to pick up rapidly from 2000 (Figure 11). Based on the data from CRC and CIC's estimate, the installed volume of large railway track maintenance machinery in China reached around 2,990 units at end-2015. Large railway track maintenance machinery is usually due for one overhaul during its lifetime, after 10-13 years of service, or after completing a certain workload amount. Therefore, many existing machines will enter their overhaul periods in the coming years.

During 2016-20, more than 1100 units of large railway track maintenance machines sold between 2003 and 2010 will require an overhaul service. We expect this to bring around Rmb4.5bn in potential revenue in 2016-20 to China



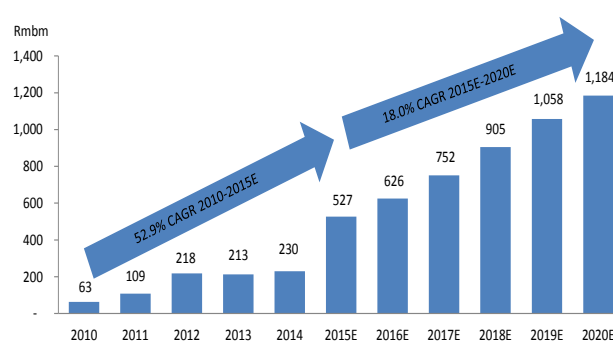
(a CAGR of 18%). The overhaul service is typically provided by the original machine supplier. Hence, as the largest machine producer in China in terms of 2015 revenue (source: CIC), we expect CRCCE to be the largest beneficiary from the rising demand for overhaul services.

Figure 11: Demand for large railway track maintenance machinery in China



Source: China Insights Consultancy, China Statistical Yearbook, Deutsche Bank estimates

Figure 12: Market size of overhaul services for China's large railway track maintenance machinery (2010-20E)



Source: China Insights Consultancy, Deutsche Bank estimates

CRCCCE expects limited competition from CRC's subsidiaries in the overhaul business in at least the next five years, owing to qualification requirements (which may take three to five years to review by the National Railway Administration), specialised equipment and techniques. CRC plans to increase its maintenance bases for large railway track maintenance machines from four to seven, mainly for daily maintenance and low-grade repairing (e.g. every three to five years); CRCCE currently has no plans to gain market share with more front-end services.

In addition, as large railway track maintenance machines usually have a lifespan of 26 years, some replacement demand has just begun to emerge recently. We believe rising replacement demand could support CRCCE's long-term outlook. On a conservative basis, the earnings model shown in this report does not include the replacement demand.

## Defensive position in the domestic market

The large railway track maintenance machinery industry in China is highly consolidated, with CRCCE forming a near monopoly, with more than 80% of the market. The industry has high entry barriers, including qualification requirements, high capital and technology intensity.

- 1) Qualification. The Chinese large railway track maintenance machinery industry places high requirements on the entrance qualifications and manufacturing and overhaul licensing of the enterprises. Each company must obtain a series of professional administrative permits from the NRA before being entitled to manufacture and sell each type of product and provide overhaul services. So far, only four Chinese companies in the market have these kinds of qualifications.
- 2) Strong technical capability. Large railway track maintenance machinery integrates a wide range of technologies and services, such

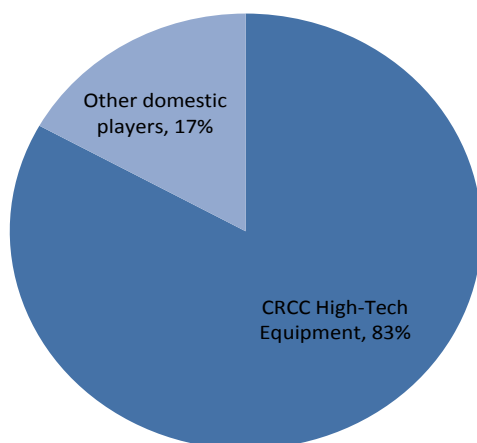


as cutting-edge electromechanical R&D and design, large-sized machinery manufacturing, intelligent automation, high-end equipment processing, assembly, debugging and after-sales services.

- 3) High production quality and safety requirements. Large railway track maintenance machinery is used to safeguard the operational safety of railway transportation. Manufacturers are obliged to ensure the quality of their products by strictly controlling the manufacturing process; otherwise, the manufacturers will run the risk of licence suspension.
- 4) Capital intensity. The capital needs for R&D, production and raw materials preparation in the large railway track maintenance machinery manufacturing industry are significant.

We think overall industry competition in China is likely to remain very limited for at least the next three to five years, as few competitors are allowed to enter this market. We believe these policies are positive for local players and will help CRCC maintain its dominant market position.

Figure 13: Market share of China large railway track maintenance machinery industry in 2014



Source: China Insights Consultancy

## Promising overseas market in the long run

In June 2015, CRCCE completed the first overseas sales of three stabilising machines to Kazakhstan, and we expect more overseas orders to come with the faster pace of overseas railway market exploration, mainly on the back of supportive government policies, such as the OBOR (“One Belt and One Road”) initiative and the “Go global” strategy. The Chinese government is aggressively encouraging Chinese railway players to explore the overseas market. The state-level OBOR plan was published in March 2015. Infrastructure connectivity is defined as a priority for implementing the plan. It encourages Chinese enterprises to participate in infrastructure construction and make industrial investments along the Belt and Road areas. According to CIC, the



demand from overseas markets is expected to generate revenue of Rmb2.5bn-Rmb3bn for China's large railway track maintenance machinery industry over the next 10 years. The key target markets include Southeast Asia, Africa, Central Asia, Western Asia and Eastern Europe.

We see rising overseas railway opportunities in the near term and long term. The 150km Jakarta-Bandung high-speed railway, the first overseas HSR project adopting all-around Chinese standards, started construction in January 2016. Railway projects in Laos, Serbia and Iran contracted by Chinese constructors have also been launched since 4Q15. Besides developing countries, China is making efforts to explore developed markets. A consortium from China has submitted bidding documents for the California high-speed railway, and the UK has opened bidding for its HS2 line to Chinese investors. We expect more opportunities for Chinese railway companies to emerge with the rolled-out OBOR plan and the rising awareness of Chinese HSR technology.

Figure 14: Near-term opportunities for Chinese railway players

Country	Project	New mileage (km)	Local currency (bn)	Total investment (USD bn)	Design speed (km/h)	Year of completion	China's involvement
Hungary/Serbia	Budapest - Belgrade	350	NA	3	200	2018	Construction started
Indonesia	Jakarta - Bandung	150	NA	5	350	2018	Construction started
Iran	Teheran-Mashhad	926	NA	2	140	2019	Construction started
Laos	Kunming - Vientiane	417	NA	6	160	2020	Construction started
Brazil/Peru	Rio De Janeiro - San Juan	3,000	NA	60	NA	NA	Feasibility study to be started
Estonia/Latvia/Lithuania/Poland/Germany	NA	960	4	4	NA	NA	Under negotiation
India	Delhi - Mumbai	1,200	NA	NA	NA	NA	Feasibility study contract
Kyrgyzstan	Kashgar - Jalalabad	472		2	NA	NA	Feasibility study to be started
Malaysia/Singapore	Kuala Lumpur-Singapore	330	38	12	350	2022	China will join the bidding
Malaysia	Malaysian southern railway	197		2	NA	NA	CRG, CRCC and CCC obtained letter of intent
Mali/Senegal	NA	NA		NA	NA	NA	CRCC in negotiation
Morocco	Marrakech-Agadir	300		NA	NA	NA	MOU has been signed
Nepal	Shigatse - Gyirong	540		NA	120	2020	
Pakistan	Karachi - Peshawar	1,726	NA	NA	NA	NA	Feasibility study contract
Russia	Moscow - Kazan	770	1,068	18	400	2018	Survey and design contract
	Tuva Elegest - Kuragino	410		NA	NA	NA	MOU has been signed
Thailand	Bangkok-Khorat	250	170	NA	250	2019	Chinese rolling stock and signalling
USA	San Jose - Burbank	700	NA	NA	350	2022	Bidding documents submitted
UK	London - Birmingham	192	12	18	400	2026	
Vietnam	Hanoi - Lao Cai	381		4	NA	NA	Feasibility study to be started
	Ha Tinh - Vientiane	500	NA	NA	NA	NA	Part of Trans-Asian railway

Source: : Sina, ifeng, Caixin



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## Government policy support

We believe CRCCE is well positioned to benefit from supportive government policies, such as:

- 1) Large railway track maintenance machinery is classified as railway transport equipment, which is one of the high-end equipment manufacturing industries. According to *the Decision of the State Council on Accelerating the Fostering and Development of Strategic Emerging Industries*, issued by the State Council in October 2010, the high-end equipment manufacturing industry is considered to be one of the “pillar industries” of the Chinese economy, and is one of the seven strategic emerging industries in China.
- 2) In 2012, the MIIT published *the 12th Five-Year Plan on the Development of the High-end Equipment Manufacturing Industry*, targeted at making breakthroughs in key track maintenance machinery technologies, improving performance and, and delivering environment-friendly operations. CRCCE will take a major responsibility in achieving this target, in our view, as it has the strongest R&D capability domestically in the industry.
- 3) Expansion of CRCCE’s overseas business would also benefit from *China’s ‘One Belt, One Road’ (OBOR) initiative and the ‘Go Global’ strategy*.
- 4) According to the *‘Made in China 2025’ plan*, issued by the State Council this year, China will focus on high-end equipment in the transformation and upgrade of its manufacturing industry, including advanced railway equipment. This should provide a favourable environment (e.g. government subsidies and preferential tax policies) for the development of the large railway track maintenance machinery industry.



# Company overview

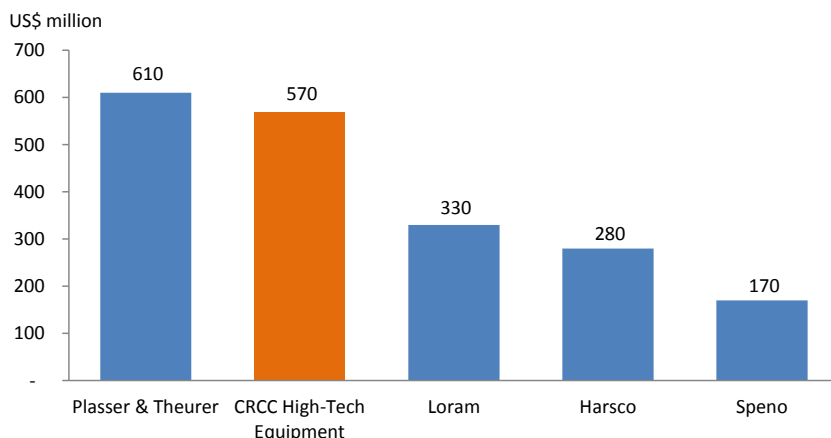
## Key points

- Global large railway track maintenance machinery leader by revenue in 2014.
- Capacity expansion and extensive sales network expected to enhance market share.
- Leadership difficult to challenge, given CRCCE's sizable capacity, comprehensive portfolio and leading technology.

## Global and national leader in large railway maintenance machinery

According to the CIC report, CRCCE was the largest railway track maintenance machinery manufacturer in Asia and the second-largest player globally in terms of sales revenue of large railway track maintenance machinery in 2014. CRCCE enjoyed a 22.6% global market share by revenue in 2014, compared with 24.1% for Austria-based industry leader, Plasser & Theurer. From 1989 to 2014, CRCCE sold around 2,200 large railway track maintenance machines domestically, representing about 81.5% of total market sales (2,700 units) in China, as estimated by CIC.

Figure 15: Top five global large railway track maintenance machinery manufacturers in 2014 by revenue



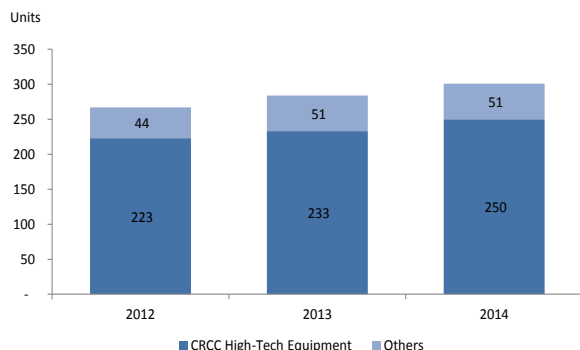
Source: Company data, China Insights Consultancy

CRCCE's business segments are as follows: manufacturing and sales of machines; parts and component sales and services; overhaul services; railway line maintenance services. According to the CIC report, CRCCE is the only company in the world that covers the entire industry value chain of large railway track maintenance machinery. It is engaged in design and R&D, manufacturing, sales and marketing, after-sales services, overhaul services, railway line maintenance services, operator training, and other services that cover the entire life-cycle of its products.



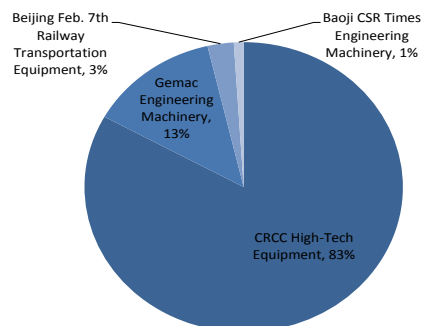
The company is the first domestic manufacturer of large railway track maintenance machinery in China. In terms of sales volume, it had an 83.5%, 82.0%, and 83.1% market share in China in 2012, 2013, and 2014, respectively, as the largest developer, manufacturer, and service provider of large railway track maintenance machinery. We believe the company could reinforce its market-leading position in China with long-term relationships with major clients, state-of-the-art technology and high industry entry barriers, and that it is likely to gain overseas market share.

Figure 16: Sales volume of Chinese large railway track maintenance machinery players



Source: China Insights Consultancy

Figure 17: Market structure in China (2014)



Source: China Insights Consultancy

## Capacity expansion and extensive service network to capture demand

### 26% capacity expansion expected for 2015-17

As of end-2015, CRCCE had two production facilities located in Kunming and Beijing in China. The company's manufacturing business was running at close to full capacity during 2013-15, and it plans to expand its manufacturing capacity in Beijing by 100 units (including 50 units for the manufacturing business and 50 units for the overhaul business) to capture growing demand in the future. The company adopts flexible production and overhaul lines that facilitate a quick response to market demand and save capital expenditure and operating costs.

Figure 18: CRCCE's production capacity and utilisation ratio

Production capacity (units)	2013	2014	2015	2016E	2017E
<b>Kunming plant</b>					
-Manufacturing	286	286	286	286	286
-Overhaul	50	50	50	50	50
<b>Beijing plant</b>					
-Manufacturing	0	0	0	0	50
-Overhaul	50	50	50	50	100
<b>Utilisation ratio</b>					
-Manufacturing			92%	94%	85%
-Overhaul			81%	100%	80%
<b>Kunming plant</b>					
-Manufacturing	n/a	96%	n/a	n/a	n/a
-Overhaul	86%	96%	n/a	n/a	n/a
<b>Beijing plant</b>					
-Manufacturing	n/a	n/a	n/a	n/a	n/a
-Overhaul	44%	59%	n/a	n/a	n/a

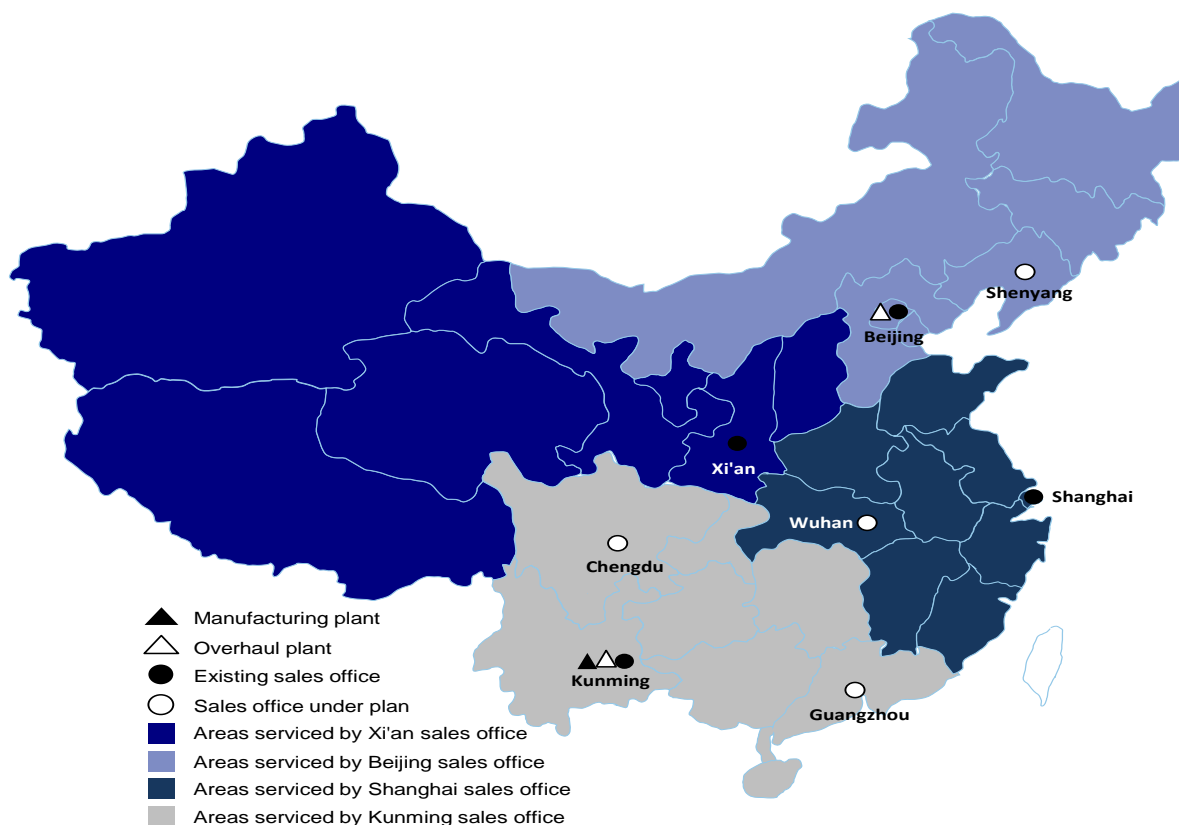
Source: Company data, Deutsche Bank estimate



### Extensive sales network

CRCC has an extensive sales network that is able to serve the entire railway network in China. The company has located sales offices near CRC and its affiliated enterprises, enabling quick responses to customers' needs. As of 31 December 2015, CRCC had established sales offices in Beijing, Kunming, Xi'an, and Shanghai, and it has plans for new sales offices in Guangzhou, Wuhan, Shenyang and Chengdu to enhance its geographical coverage.

Figure 19: CRCC's nationwide production facilities and sales network



Source: Company data

## Leadership difficult to challenge

### Comprehensive portfolio to drive competitiveness

CRCC owns a broad product spectrum of large railway track maintenance machinery, applied in the construction of new railways, the modification of existing railways, and the maintenance of operating railways. The company's machines can be categorised into seven major series and cover 40 product types. Major products include the tamping machine series, stabilisation machine series, ballast cleaning machine series, ballast regulator series, materials logistics machine series and the rail processing machine series (Figure 21 and Figure 22). These machines are applied towards normal-speed railways, high-speed railways and urban-rail transit systems. CRCC is able to customise each series of machinery according to customers' requests.

Besides the manufacturing and sale of machines, the operations of CRCC extend to the entire industry value chain, including design and R&D, after-sales



service, overhauls, railway lines maintenance, operator training and other services covering the entire life-cycle of its products. Its products have applications in the construction, modification and maintenance of national railways, local railways, urban rail transit systems, and other rail systems. These enable the company to provide comprehensive and systematic solutions to its customers. Figure 20 shows the detailed product descriptions.

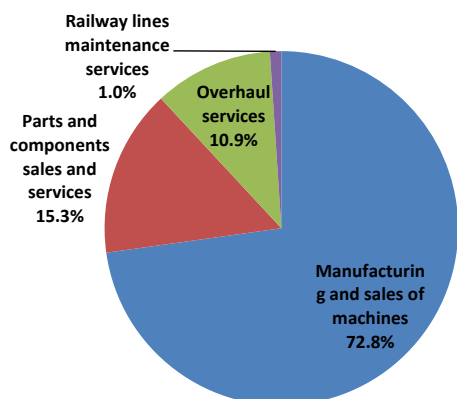
**Figure 20: CRCCE's products and services**

Business	Product/Service	Description
	Tamping machine series	Tamping machines are used when the ballast track bed deteriorates, loses straightness or curve, and exhibits vertical and horizontal misalignment. Tamping operations comprise track lining, lifting and levelling, to restore the track alignment and the straightness and curve of the track.
	Ballast cleaning machine series	Ballast cleaning machines are used when the degree of fouling (losing its elasticity) on the railway track exceeds 30%. They are operated by excavating the fouled ballast from under the sleepers and cleaning the ballast in an oscillating screening working device, before returning the cleaned ballast to the track bed. The residue from the cleaning operations is transported to both sides of the tracks or removed using material conveyor machines.
	Stabilisation machine series	Stabilising machines are used after tamping and ballast cleaning operations when ballast track beds may not be sufficiently dense. Stabilising operations will help reduce temporary speed restrictions of trains passing by and ensure that the railway track returns to optimum stability as soon as possible.
<b>Manufacturing and sales of machines</b>	Ballast regulator series	Ballast regulator machines shape the ballast of the track shoulder to make the cross section of the track bed meet the required standards, distribute ballast uniformly using the centre plough, and remove the ballast left behind on the sleeper and the fasteners after the operation.
	Materials logistics machine series	Material conveyors are used to transport the residue generated from ballast cleaning operations, preventing the waste ballast and mud from fouling the track and railway station. One or more such machines can be operated synchronously as a team with ballast cleaning machines or formation rehabilitation machines to supply new ballasts through overhaul or maintenance operations.
	Rail processing machine series	The milling and grinding processes re-profile the rail head to eliminate rail defects and improve the smoothness of the rail surface and improve the wheel-rail contact relation. Rail welding machines are used for the construction of new railways, as well as the reformation of existing railway lines to complete on-railway, off-railway and lock welding.
	Other machinery series	Other machines include catenary inspection and maintenance machines, catenary installation machines and other large railway track maintenance machines that integrate mechanical, hydraulic, pneumatic and automation control systems.
<b>Parts and component sales and services</b>	Bogies, electrical control systems, working devices, wheelsets, transmissions, pumps, valves, motors and drive shafts	CRCCCE manufactures, purchases and sells various types of parts and components.
<b>Overhaul services</b>	Tamping machine series, stabilisation machine series, ballast cleaning machine series, and ballast regulator series	Overhaul work includes repair, upgrade and remanufacture.
<b>Railway line maintenance services</b>	Maintenance of newly-built and existing railway lines	Customers are charged by the amount of work or the mileage for which large railway track maintenance machines are operated.

Source: Company data

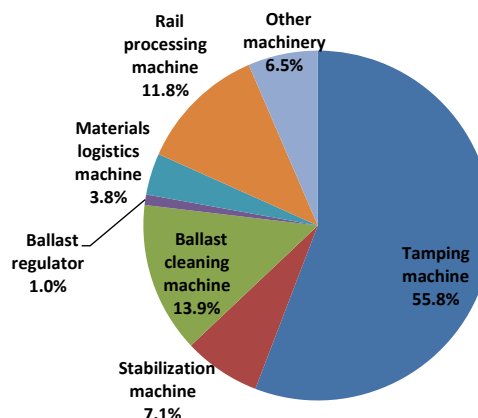


Figure 21: CRCCE's revenue breakdown, 2015



Source: Company data

Figure 22: CRCCE's sales breakdown in manufacturing and sales of machines, 2015



Source: Company data

### Strong R&D capacity

Large railway track maintenance machinery is a high-tech product that integrates mechanical, electric, hydraulic, pneumatic, computer and automation technologies. It principally comprises the following major parts: engine system, power transmission system, walking system, electric system, hydraulic system and working system.

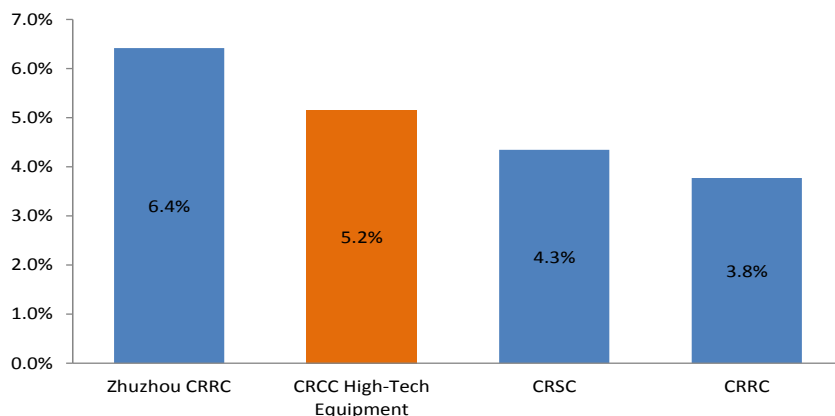
CRCC enjoys strong research and development capabilities and leading-edge technology in China. The company has a leading R&D platform that has received multiple awards from the government. The company is also currently China's only "National Large Railway Track Maintenance Machinery Engineering Research Centre". CRCC played a leading role in the formulation and revision of more than 12 national standards for the large railway track maintenance machinery industry in China, and it owns 197 relevant patents.

Thanks to its strong research and development capabilities, CRCC has developed and manufactured innovative products such as track welding machines, steel rail milling and grinding machines, and machinery suitable for high-altitude environments, which can meet the special needs arising from the geographical, climatic and regulatory environments in China. CRCC has adopted advanced development and manufacturing technologies from overseas peers (e.g. Austria-based Plasser & Theurer) and entered into agreements with famous research institutions, which has allowed the company to establish its exclusive IP rights.

CRCC dedicates significant resources to the research and development of new materials, products and manufacturing processes to maintain its market-leading position. Total expenditure on research and development represented 4-7% of total revenue during 2013-15, in order to produce innovative products and components, upgrade product mix and improve margin levels, meet specific client requests, and enhance market share. We forecast that total expenditure on research and development in 2016 and 2017 will amount to Rmb200m for each year, representing more than 4% of total revenue (still higher than CRCC's ratio).



Figure 23: R&D expenses to sales ratios for major railway equipment producers in China (historical average in 2013-2015)



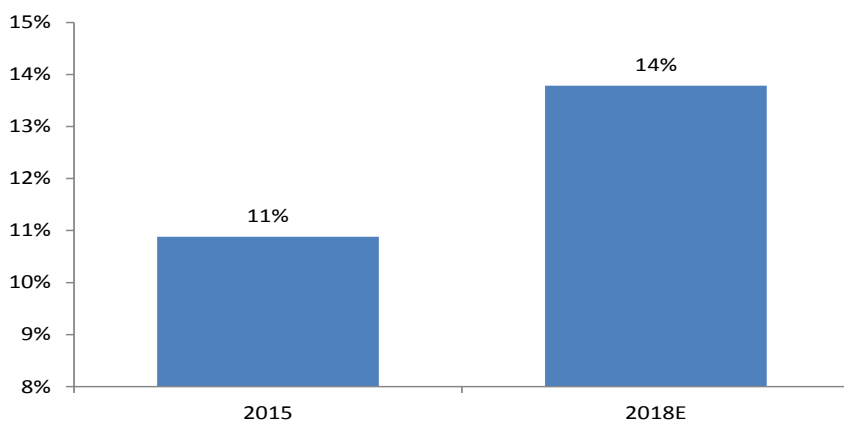
Source: Company data

## Overhaul service will be the key earnings driver in 2016-18

As discussed in an earlier section (“Strong growth in the overhaul service”), we have a positive outlook on CRCCE’s overhaul service business, considering the fast growth of the domestic market size, which we believe could be one of CRCCE’s key revenue drivers from 2015.

Besides the increasing volume of machines, the gross margin of the overhaul segment rose from 13.5% in 2012 to 29% in 2015. We expect the gross margin of the overhaul business to improve further with more high-level overhauls and better scale, which should be much higher than that of manufacturing. Management has guided that the contract value of the overhaul service usually represents around 40% of new equipment’s selling price. In 2015, the company’s revenue from overhaul service businesses accounted for 11% of total sales. We expect this ratio to reach 14% in 2018.

Figure 24: Revenue contribution from CRCCE’s overhaul services



Source: Company data, Deutsche Bank estimates



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## Positive long-term growth from overseas markets

CRCCE kicked off its overseas market operations (no direct exports before 2015) by completing its first overseas sale of three stabilising machines to Kazakhstan in 2015. We are positive on the potential for the company in overseas markets. As stated in the section, “Promising overseas market in the long run”, China’s OBOR initiative and the ‘Go Global’ strategy for high-end equipment provide long-term growth momentum for CRCCE. We believe overseas market expansion will be reflected not only in its overseas orders but also in its domestic orders, since its products can also be procured and exported by Chinese constructors (such as CRCC – its parent company, CRG).

CRCCE plans to establish its presence in target markets such as Africa, the Middle East, Southeast Asia and South America, through the setting up of offshore plants, joint ventures and M&As to broaden its international business network. Its acquisition targets are potentially in Europe, with high growth potential, which engage mainly in large railway track maintenance machinery research and development, according to CRCCE.

We now forecast close to 1% of total sales from overseas markets in 2018 (excluding products sold to constructors for export purposes).



# Financials

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## Income statement

### Revenue to grow to Rmb5,614m in 2018E, implying three-year CAGR of 12%

According to CIC, the market size of China's large railway track maintenance machinery will increase by 9% in 2016, to Rmb3.9bn, 11% in 2017, and 11% in 2018. Rmb2.3bn will be spent on overhaul services in FY16-18 (vs. Rmb969m in FY13-15), representing a 20% CAGR for FY15-18.

We believe CRCCE is well positioned to benefit from this growth as a dominant domestic player. The company's backlog stood at Rmb2.4bn at the end of 2015. In December 2015, the company won Rmb2.25bn-worth of new orders that were kicked off by CRC, representing 88% of the total bidding amount. On the back of a 10%+ CAGR for new order growth over 2015-2018E, we estimate that revenue will witness a 12% CAGR during the same period, to reach Rmb5,614m in 2018.

### Key sales contribution: manufacturing and sales of machines

The manufacturing and sale of machines is CRCCE's largest business in terms of revenue. About 73% of total sales came from this business in 2015, within which tamping and stabilisation machines accounted for 63%. We believe demand for tamping, stabilisation and ballast regulator machines will move at a similar trend of an 11% CAGR during 2015-2018, since they are usually operated in sets (with one set including two tamping machines, two stabilisation machines and one ballast regulator machine). We believe demand for ballast cleaning machines will pick up later, starting in 2018. Compared with tamping, stabilisation and ballast regulator machines, which are required from the start of the construction of a new railway, ballast cleaning machines are usually used after five to seven years of railway operation.

### Rapid growth of overhaul service business over 2015-2018E

CRCCE's overhaul service business remained relatively stable in 2012-14, but doubled in 2015, when increasing machines entered their overhaul period. We believe solid growth will continue, and we expect sales of this segment to register a 21% CAGR in 2015-18. According to the CIC report, around 48% of the current large railway track maintenance machines should require overhaul services in the next five years. Meanwhile, the rising overhaul business of large railway track maintenance machinery has been transferred from local railway bureaus to original producers, owing to higher technology requirements than normal repairs. Hence, CRCCE is set to become the largest domestic beneficiary as the dominant producer.



Figure 25: Key earnings assumptions

	2014	2015	2016E	2017E	2018E
<b>Turnover (Rmbm)</b>	<b>3,477</b>	<b>3,973</b>	<b>4,421</b>	<b>4,922</b>	<b>5,614</b>
Manufacturing and refurbishment of rolling stock products	2,791	2,892	3,143	3,428	3,861
Tamping machine series	1,908	1,615	1,776	1,954	2,208
Stabilisation machine series	449	206	227	250	282
Ballast cleaning machine series	133	402	402	402	483
Ballast regulator series	141	28	31	34	38
Materials logistics machine series	63	111	124	136	150
Rail processing machine series	83	342	228	298	298
Other machinery	15	187	355	355	403
Parts and components sales and services	440	607	699	803	924
Overhaul services	215	432	534	641	774
Railway lines maintenance services	30	41	45	50	55
<b>Sales breakdown (%)</b>					
Manufacturing and refurbishment of rolling stock products	80%	73%	71%	70%	69%
Tamping machine series	55%	41%	40%	40%	39%
Stabilisation machine series	13%	5%	5%	5%	5%
Ballast cleaning machine series	4%	10%	9%	8%	9%
Ballast regulator series	4%	1%	1%	1%	1%
Materials logistics machine series	2%	3%	3%	3%	3%
Rail processing machine series	2%	9%	5%	6%	5%
Other machinery	0%	5%	8%	7%	7%
Parts and components sales and services	13%	15%	16%	16%	16%
Overhaul services	6%	11%	12%	13%	14%
Railway lines maintenance services	1%	1%	1%	1%	1%
<b>Revenue growth (%)</b>	<b>10%</b>	<b>14%</b>	<b>11%</b>	<b>11%</b>	<b>14%</b>
Manufacturing and refurbishment of rolling stock products	17%	4%	9%	9%	13%
Tamping machine series	41%	-15%	10%	10%	13%
Stabilisation machine series	39%	-54%	10%	10%	13%
Ballast cleaning machine series	-35%	203%	0%	0%	20%
Ballast regulator series	30%	-80%	10%	10%	13%
Materials logistics machine series	-74%	76%	11%	10%	10%
Rail processing machine series	-5%	313%	-34%	31%	0%
Other machinery	-81%	1153%	90%	0%	14%
Parts and components sales and services	-20%	38%	15%	15%	15%
Overhaul services	8%	101%	23%	20%	21%
Railway lines maintenance services	-5%	37%	10%	10%	10%
<b>Gross margin breakdown (%)</b>	<b>23.5%</b>	<b>24.0%</b>	<b>24.2%</b>	<b>24.5%</b>	<b>24.5%</b>
Manufacturing and refurbishment of rolling stock products	19%	20%	20%	20%	20%
Parts and components sales and services	46%	36%	36%	36%	36%
Overhaul services	33%	29%	30%	30%	30%
Railway lines maintenance services	58%	52%	52%	52%	52%

Source: Deutsche Bank estimates, Company data

### Gross margin should expand in 2016-18E

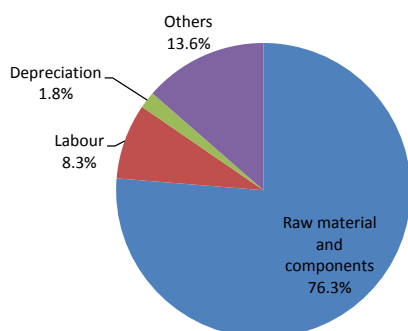
Raw materials and components accounted for more than 75% of CRCCE's total cost of sales in 2013-15, within which we believe raw material costs accounted for around 10% and the other costs are parts and components. Key parts and components are used mainly on the four systems (driveline systems,



air brake systems, hydraulic systems and electrical control systems). CRCCE mainly procures certain components from independent third-party suppliers, including certain overseas suppliers. Through long-term cooperation agreements with raw material and component suppliers, the company has managed to maintain a secure supply. CRCCE normally enters into annual or quarterly framework purchase agreements with its suppliers, with a fixed product price or price range, in order to avoid the risk of price fluctuations.

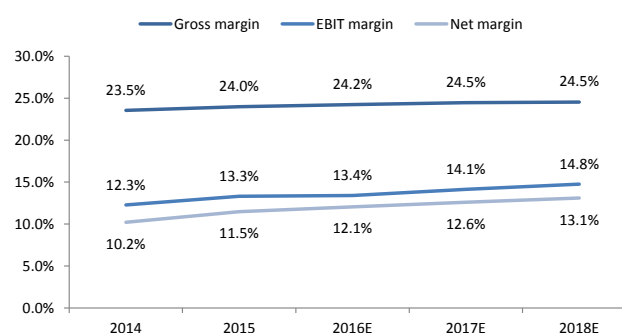
We now expect CRCCE's gross margin to expand gradually, to 24.5% in 2018, from 24.0% in 2015, owing mainly to: 1) a business mix upgrade from a higher sales proportion of the higher-margin overhaul business (12.1%-13.8% in 2016-18E, vs. 10.9% in 2015), 2) upgrading of traditional products to high-efficiency machines (e.g. tamping and stabilising machines, high-power ballast cleaning machines), 3) rising delivery of high-margin new products (e.g. rail milling machines for high-speed rail and urban rapid transit systems, catenary inspection and maintenance machines) and 4) better economies of scale. We think cheaper imported components (owing to the potential depreciation of the Euro against the Rmb) may further benefit the margins. Our model did not reflect any Euro depreciation.

Figure 26: CRCCE's cost structure, 2015



Source: Deutsche Bank estimates

Figure 27: CRCCE's margin trend



Source: Deutsche Bank estimates, Company data

#### SG&A expenses to sales ratio to be stable

CRCCE's SG&A to sales ratio declined from 12.3% in 2014 to 11.6% in 2015, owing mainly to better selling expense control and a decline in R&D expenses. Based on management guidance, we now forecast R&D expenses to be stable at around Rmb200m in the next few years and the administrative expenses (excluding R&D) to sales ratio should decline on better control cost, while the selling expenses to sales ratio should remain largely stable, owing to the exploration of new markets. We expect the SG&A expenses to sales ratio to gradually decline, to 10.5% in 2018, from 11.6% in 2015.

#### Favourable income tax rate should be sustainable

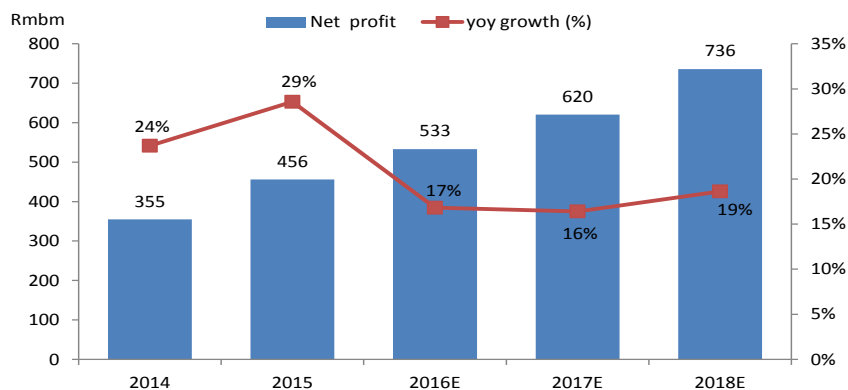
CRCCE's effective income tax rate was 12.9% in 2014 and 13.4% in 2015. CRCCE and a number of its subsidiaries enjoy favourable income tax rates of 15%, as they are recognised as high and new technology enterprises by the PRC government or are qualified for China's western region development policies. They are also entitled to R&D expense super-deductions, which allow for a 150% deduction of actual R&D costs from the tax base. Hence, we now forecast CRCCE's effective income tax rate to remain stable at 13% until 2020.



### We expect healthy 2015-18 earnings growth

We expect CRCC's earnings growth to be driven by healthy demand for new equipment and the overhaul service for large railway track maintenance machinery and margin expansion. We project that the company's net profit will increase by 17% in 2016 – to Rmb533m, 16% in 2017 – to Rmb620m, and 19% in 2018 – to Rmb736m, after a 29% rise in 2015.

Figure 28: CRCC's net profit trend



Source: Deutsche Bank estimates, Company data

Figure 29: CRCC's income statement (2014-18E)

Year to Dec (Rmb m)	2014	2015	2016E	2017E	2018E
<b>Sales</b>	<b>3,477</b>	<b>3,973</b>	<b>4,421</b>	<b>4,922</b>	<b>5,614</b>
Cost of sales	2,658	3,020	3,349	3,718	4,236
<b>Gross profit</b>	<b>819</b>	<b>954</b>	<b>1,071</b>	<b>1,204</b>	<b>1,378</b>
Gross margin (%)	23.5%	24.0%	24.2%	24.5%	24.5%
Other income and gains	67	41	59	58	61
Selling and distribution Expenses	72	64	72	80	91
Administrative expenses	357	396	443	466	498
Other expenses, net	18	3	4	4	4
<b>Profit from operations</b>	<b>439</b>	<b>532</b>	<b>613</b>	<b>713</b>	<b>846</b>
Interest expense	23	6	-	-	-
<b>Profit before tax</b>	<b>416</b>	<b>526</b>	<b>613</b>	<b>713</b>	<b>846</b>
Income tax expense	(54)	(70)	(80)	(93)	(110)
Minority interests	(7)	1	-	-	-
<b>Net profit</b>	<b>355</b>	<b>456</b>	<b>533</b>	<b>620</b>	<b>736</b>

Source: Deutsche Bank estimates, Company data

### Balance sheet

We believe CRCC should be able to maintain a strong balance sheet. We expect its cash balance to reach Rmb1,416m at end-2018. We expect the company to maintain a strong net cash position over 2016-18.

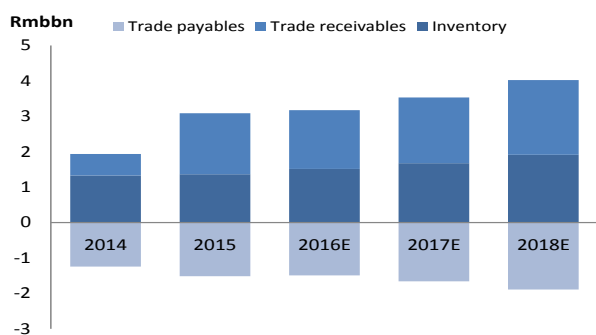
Total receivables stood at Rmb1,725m at end-2015, compared with Rmb595m at end-2013 and Rmb609m at end-2014, mainly on a slightly late delivery schedule (CRC made its payment in January 2016). Accordingly, its receivable days in 2015 rose to 158, from 64 in 2014 and 69 in 2013. The company



maintained effective inventory management in 2015, and recorded a continued improvement in inventory days (165 days at end-2015, vs. 182 at end-2014 and 285 at end-2013). CRCCE guided that the current inventory level (with turnover days of 165) should be reasonable going forward. We believe receivable days will stay at a relatively high level of 130 and that payable days will return to normal levels of 140. Overall, the cash conversion cycle should remain stable, at around 139 days in 2016-18E.

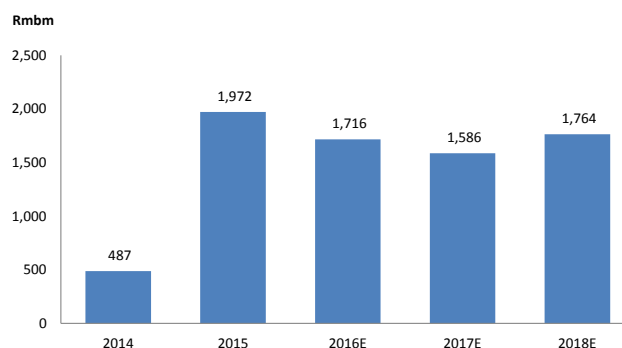
In August 2015, CRCCE acquired a 33% stake in Ruiweitong Company. After this acquisition, Ruiweitong Company became a wholly-owned subsidiary of CRCCE. Besides Ruiweitong, CRCCE has five subsidiaries that are all wholly-owned (see Figure 34). The minority interest declined to zero at end-2015.

Figure 30: Working capital requirement (2014-18E)



Source: Deutsche Bank estimates, Company data

Figure 31: Net cash position (2014-2018E)



Source: Deutsche Bank estimates, Company data



Figure 32: Balance sheet (2014-18E)

Year to Dec (Rmb m)	2014	2015	2016E	2017E	2018E
Property, plant and equipment	1,011	947	1,526	1,961	2,110
Lease prepayments	278	423	423	423	423
Other intangible assets	3	18	18	18	18
Available-for-sale investments	227	240	240	240	240
Interests in associates	260	21	21	21	21
Deferred tax assets	23	19	19	19	19
<b>Non-current assets</b>	<b>1,802</b>	<b>1,668</b>	<b>2,247</b>	<b>2,682</b>	<b>2,831</b>
Inventories	1,326	1,361	1,510	1,676	1,910
Trade and other receivables	609	1,725	1,662	1,851	2,111
Pledged deposits	166	300	300	300	300
Bank balances and cash	321	1,673	1,416	1,287	1,465
<b>Current assets</b>	<b>2,428</b>	<b>5,069</b>	<b>4,899</b>	<b>5,124</b>	<b>5,796</b>
<b>Total assets</b>	<b>4,230</b>	<b>6,738</b>	<b>7,146</b>	<b>7,807</b>	<b>8,627</b>
Trade and bills payables	966	1,324	1,285	1,426	1,625
Other payable and accruals	279	190	211	234	267
Defined benefit obligations	1	1	1	1	1
Tax payables	29	18	18	18	18
Provision for warranties	8	10	10	10	10
<b>Current liabilities</b>	<b>1,289</b>	<b>1,547</b>	<b>1,529</b>	<b>1,693</b>	<b>1,925</b>
Defined benefit obligations	2	1	1	1	1
Deferred tax liabilities	26	28	28	28	28
Other non-current liabilities	24	19	19	19	19
<b>Non-current liabilities</b>	<b>52</b>	<b>49</b>	<b>49</b>	<b>49</b>	<b>49</b>
<b>Total liabilities</b>	<b>1,341</b>	<b>1,596</b>	<b>1,577</b>	<b>1,742</b>	<b>1,973</b>
<b>Total equity and liabilities</b>	<b>4,230</b>	<b>6,738</b>	<b>7,146</b>	<b>7,807</b>	<b>8,627</b>
Total net assets	2,840	5,142	5,568	6,065	6,654
Minority interests	49	-	-	-	-
<b>Total combined equity</b>	<b>2,889</b>	<b>5,142</b>	<b>5,568</b>	<b>6,065</b>	<b>6,654</b>

Source: Deutsche Bank estimates, Company data

## Cash flow

CRCC had a working capital decrease of Rmb1,027m in 2015. This was due primarily to uneven payments made by CRC in previous years. Accordingly, CRCC's operating cash flow in 2015 was negative Rmb503m (vs. -Rmb254m in 2014). We believe operating cash flow will improve in 2016-18, with solid earnings growth and fewer fluctuations in working capital changes. We expect the company's net cash flow from operating activities to rise to Rmb630m in 2018, from Rmb520m in 2016, largely because of healthy revenue growth.

Our model assumes capital expenditure of Rmb670m, Rmb565m and Rmb305m for 2016, 2017 and 2018, respectively, mainly for the production capacity expansion in the Beijing plant (c.Rmb900m) and the establishment of new sales offices (c.Rmb600m, see Figure 19). However, we believe CRCC should be able to maintain a healthy cash balance over this period, due primarily to sustainable revenue growth and a well-managed working capital cycle. CRCC's cash balance at end-2015 was Rmb1,673m, which we expect to remain stable, at Rmb1,465m, by end-2018.



Figure 33: Cash flow statement (2014-18E)

Year to Dec (Rmb m)	2014	2015	2016E	2017E	2018E
<b>Profit before tax</b>	<b>416</b>	<b>526</b>	<b>613</b>	<b>713</b>	<b>846</b>
<b>Adjustments:</b>					
Depreciation of items of property, plant and equipment	70	70	91	130	157
Amortisation of lease prepayments	7	9	-	-	-
Amortisation of other intangible assets	1	6	-	-	-
Interest income	(12)	(3)	(20)	(18)	(18)
Finance costs	23	6	-	-	-
Others	6	(15)	-	-	-
<b>Change in working capital</b>	<b>(731)</b>	<b>(1,027)</b>	<b>(104)</b>	<b>(190)</b>	<b>(262)</b>
Interest received	12	3	20	18	18
PRC income tax paid	(45)	(77)	(80)	(93)	(110)
<b>Net cash used in operating activities</b>	<b>(254)</b>	<b>(503)</b>	<b>520</b>	<b>560</b>	<b>630</b>
Purchases of items of property, plant and equipment, excluding interest capitalised	(30)	(16)	(670)	(565)	(305)
Investment income on available-for-sale investments	3	4	-	-	-
Proceeds from disposal of lease prepayments	59	-	-	-	-
Proceeds from disposal of a subsidiary	8	-	-	-	-
Proceeds from disposal of items of property, plant and equipments	2	1	-	-	-
<b>Net cash used in investing activities</b>	<b>39</b>	<b>(29)</b>	<b>(670)</b>	<b>(565)</b>	<b>(305)</b>
Repayment of bank loan and other borrowings	(1,173)	(674)	-	-	-
Proceeds from bank and other borrowings	390	674	-	-	-
Dividends paid	(70)	(368)	(107)	(124)	(147)
Interest paid	(23)	(6)	-	-	-
Proceeds from share issues	-	2,270	-	-	-
<b>Net cash generated from financing activities</b>	<b>(1,117)</b>	<b>1,878</b>	<b>(107)</b>	<b>(124)</b>	<b>(147)</b>
<b>Increase in cash and cash equivalents</b>	<b>(1,333)</b>	<b>1,345</b>	<b>(257)</b>	<b>(129)</b>	<b>178</b>
<b>Cash and cash equivalents at beginning of year</b>	<b>1,657</b>	<b>321</b>	<b>1,673</b>	<b>1,416</b>	<b>1,287</b>
Effect of exchange rates on cash flows	(4)	6	-	-	-
<b>Cash and cash equivalents at end of year</b>	<b>321</b>	<b>1,673</b>	<b>1,416</b>	<b>1,287</b>	<b>1,465</b>

Source: Deutsche Bank estimates, Company data



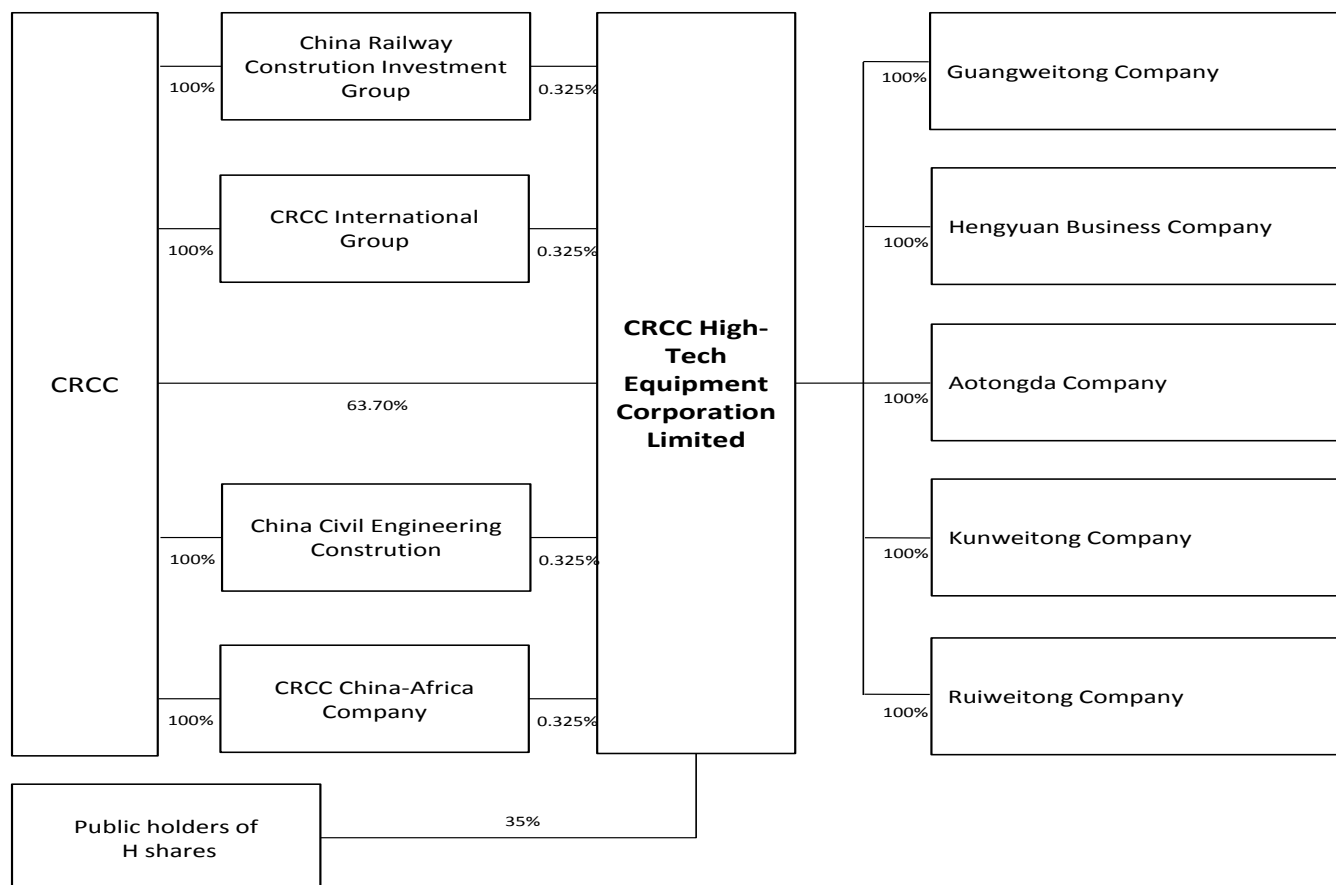
# Appendix A: company profile

## Company and management background

### Company history

The history of CRCC can be traced back to 1954, when the Mechanical Maintenance, Operation, and Leasing Station of the 6<sup>th</sup> Engineering Division of Newly-built Railways Construction Central Bureau under the MOR was established in Baoji, China. It became a state-owned limited liability company in August 2002, with 55.66% of equity interest held by CRCCG, which became the company's sole shareholder five years later. According to an equity transfer agreement, CRCCG injected 100% of the company's equity interest as a capital contribution into CRCC, making the company a wholly-owned subsidiary of CRCC in November 2007. In March 2015, CRCC transferred 2% equity of the company to its four wholly-owned subsidiaries.

Figure 34: Organisational structure at end-2015



Source: Company data



### Professional and experienced management team

CRCC's senior management team has, on average, more than 20 years of experience in the industry, with an average age of 50. The management team has strong industry knowledge, extensive operational experience, including production management, quality control, sales and marketing, and research and development, and has a good track record of delivering growth and profitability for CRCC.

Figure 35: Profiles of executive directors and senior management

Name	Position	Age	Experience
<b>Ren, Yanjun</b>	Chairman, Executive Director, General Manager	54	Mr. Ren Yanjun, aged 54, joined the company in July 1985. He was appointed as general manager and director in January 2010, and was appointed as chairman of the company in January 2015. Mr. Ren has 30 years of experience in railway maintenance, machinery manufacturing and repair. He has served as an engineer, deputy head of the training centre and manager at the Kunming Railway South Trading company, divisional manager at the design division, and as department head of the product development department of Kunming Machinery Factory. He became deputy general manager and senior engineer in 2004 and 2010, respectively. Mr. Ren obtained a senior engineer certificate issued by the Factory Bureau under CRCCG in 1997, and obtained a senior professional manager certificate issued by China Enterprise Confederation and China Entrepreneurs Association in 2006. He obtained a bachelor's degree in mechanical engineering from Southwest Jiaotong University in 1983.
<b>Ma, Yunkun</b>	Executive Director	60	Mr. Ma Yunkun, aged 60, joined the company in November 1986. He was appointed as director in 2003 and senior economist in 2006. Mr. Ma has 29 years of experience in railway maintenance, machinery manufacturing and repair. He has worked for the company as chairman, general manager, director, economist and senior economist. In September 2005, he assumed the responsibilities of a non-executive director of Zhuzhou CSR Times Electric Co., Ltd. Mr. Ma obtained a senior economist certificate issued by CRCCG in March 2006, and obtained a senior professional manager certificate issued by China Enterprise Confederation and China Entrepreneurs Association in December 2005. He obtained a bachelor's degree in administration management through distance learning from Lanzhou University in 2007.
<b>Jiang, He</b>	Executive Director, Vice General Manager	49	Mr. Jiang He, aged 49, joined the company in August 1987, and was appointed as vice general manager and director of the company in 2003 and 2006, respectively. He has 28 years of experience in railway maintenance, machinery manufacturing and repair. He has served as a technician and assistant engineer for Kunming Machinery Factory since 1987, and divisional manager, engineer, union president and deputy factory manager since 1994. He obtained a senior engineer certificate issued by CRCCG in 2008 and a master's degree in business administration from Southwest Jiaotong University in 2009.
<b>Yu, Yuanlin</b>	Executive Director, Vice General Manager, Chief Financial Officer	50	Mr. Yu Yuanlin, aged 50, joined the company in June 2010, and was appointed vice general manager and chief financial officer in 2012 and as executive director in June 2015. He has 32 years of experience in accounting and financial management. Before joining the company, he worked for the supervisory committee under SASAC, China Railway Construction as accountant, director and financial controller. From June 2010 to October 2012, he served as the vice department head and the vice chief financial officer of the company. Mr. Yu obtained the qualification of certified public accountant issued by the Chinese Institute of Certified Public Accountants in 1998. He obtained a college diploma in Chinese language and literature from Hubei University in 1986. Since 2012, he has studied for a master's degree in Shijiazhuang Railway University, majoring in business management.
<b>Hu, Bin</b>	Vice General Manager, chief engineer	49	Mr. Hu Bin, aged 49, joined the company in August 1987, and was appointed as chief engineer in 2004 and vice general manager in 2011. He has 29 years of experience in R&D and the manufacturing of railway maintenance machinery. Since 1987, he has served successively as engineer, deputy divisional manager, deputy department head and deputy chief engineer of Kunming Machinery Factory. Since September 2007, he has served as a doctoral tutor of Kunming University of Science and Technology, specialising in mechanical design and theory. Mr. Hu obtained a professorate senior engineer certificate issued by CRCCG in 2006. He obtained a bachelor's degree in the mechanisation of railways from Shanghai Railway College in 1987.
<b>Yang, Chaokai</b>	Union President, Vice General Manager	55	Mr. Yang Chaokai, aged 55, was appointed as union president in November 2008 and vice general manager in June 2015. He joined the company in June 1991, and has 25 years of experience in labour and salary and railway maintenance, machinery manufacturing and repair. He served as the operation manager and administration engineer at the diversified operation office of Kunming Machinery Factory from 1997 to 2000, and he worked for the general assembly shop as vice manager and administration engineer from 2000 to 2008. Mr. Yang obtained a senior administration engineer certificate issued by CRCCG in 2013. He obtained a bachelor's degree in law from the Party University under Yunnan Provincial Communist Party Committee in 2003.

Source: Company data



Figure 35: Profiles of executive directors and senior management – Contn'd

Name	Position	Age	Experience
<b>Huang, Zhaoxiang</b>	Vice General Manager	52	Mr. Huang Zhaoxiang, aged 52, joined the company in August 1986, and was appointed as vice general manager of the company in March 2003. Before 2003, he worked as assistant engineer, divisional manager and deputy factory manager for Kunming Machinery Factory. He has 30 years of experience in railway maintenance, machinery manufacturing and repair. He was granted a senior engineer certificate issued by the Factory Bureau under CRCCG in April 2000 and a senior professional manager certificate issued by China Enterprise Confederation and China Entrepreneurs Association in December 2005. He obtained a bachelor's degree from Southwest Jiaotong University in 1986, majoring in mechanical engineering.
<b>Zhang, Zhong</b>	Vice General Manager	52	Mr. Zhang Zhong, aged 52, was appointed as vice general manager of the company in January 2010. He joined the company in August 1986, and has 30 years of experience in railway maintenance, machinery manufacturing and repair. Mr. Zhang worked for Kunming Machinery Factory from 1986 to 2010, as engineer, divisional manager, and vice general economist. He obtained a bachelor's degree in railway trains from Changsha Railway College in July 1984.
<b>Sun, Guoqing</b>	Vice General Manager	54	Mr. Sun Guoqing, aged 54, joined the company in February 1983, and was appointed as vice general manager in January 2010. From 1992 to 2004, he served successively as a dispatcher, deputy director, director and distinguished economist at the assembly shop of Kunming Machinery Factory, and he became deputy chief economist, chief dispatcher and manager of the general manufacturing factory in 2004. Mr. Sun has 33 years of experience in railway maintenance, machinery manufacturing and repair. Mr. Sun obtained a bachelor's degree through correspondence courses from the Institute of Yunnan University of Finance and Economics in 2009, majoring in economic management.
<b>Chen, Yongxiang</b>	Vice General Manager	49	Mr. Chen Yongxiang, aged 49, joined the company in August 1989, and was appointed as vice general manager in January 2010. He has 27 years of experience in railway maintenance, machinery manufacturing and repair. Since 1989, he has successively worked for Kunming Machinery Factory as a technical supervisor, engineer, deputy director and manager of different workshops. Mr. Chen obtained a bachelor's degree in machining procedure and equipment from East China Jiaotong University in 1989, and a master's degree in international economics and commercial relations from Nankai University in 2013.
<b>Tong, Pujiang</b>	Vice General Manager	37	Mr. Tong Pujiang, aged 37, was appointed as vice general manager in January 2015. He joined the company in August 1999, and has 17 years of experience in railway maintenance, machinery manufacturing and repair. From 1999 to 2005, he served at Kunming Machinery Factory as assistant engineer. After that, he became company secretary, engineer, assistant to general manager and manager of the general manufacturing factory. He obtained a bachelor's degree in electric engineering and automation from Southwest Jiaotong University in 2010. He graduated as a postgraduate student from Chinese Communist Party School in 2014, majoring in economic management.
<b>Ma, Changhua</b>	Secretary of the Board	41	Mr. Ma Changhua, aged 41, joined the company in July 1996, and was appointed as the secretary of the Board in February 2015. He has worked for Kunming Machinery Factory as an engineer, head of the information management department, office director, assistant to the general manager, and commander in the construction instruction department. He has 20 years of experience in railway maintenance, machinery manufacturing and repair. Mr. Ma obtained a master's degree in software engineering from Yunnan University in 2005, as well as a master's diploma in international economics and commercial relations from Nankai University in 2014.

Source: Company data



## Products and production processes

Figure 36 shows the details of CRCCE's representative products within the tamping machine series, stabilisation machine series, ballast cleaning machine series, ballast regulator series, materials logistics machine series and the rail processing machine series.

Figure 36: Product description

Product series	Type	Model number	Product description
<b>Tamping machine series</b>	Tamping machine	DC-32	A simple and economical double-sleeper step tamping machine, used widely in railway track maintenance, overhaul, construction and modification, and applied primarily for overhaul operations. It can reach an operational efficiency of 1.2 km/h. CRCCE also produces a high altitude specification type of this machine.
	Continuous movement tamping machine	DCL-32	A continuous movement double-sleeper tamping machine. Comprising a primary carriage and a secondary carriage, the primary carriage operates by continuous movement, while the secondary carriage operates by single-step movement guided by the track. It can reach an operational efficiency of 1.8 km/h. CRCCE also produces a high-altitude specification type of this machine.
	Continuous movement tamping and stabilising machine	DWL-48	A continuous movement triple-sleeper tamping machine that combines both tamping and stabilisation functions in one machine. It carries out tamping and stabilisation operations synchronously, and can reach an operational efficiency of 2.3 km/h. CRCCE also produces a high-altitude specification type of this machine.
	Turnouts tamping machine	CDC-16	A single-sleeper tamping machine used to carry out track lifting, lining and tamping operations on turnouts. It can also be used to carry out operations on main railway lines. It can reach an operational efficiency of 0.5 km/h. CRCCE also produces a high-altitude specification type of this machine.
	Turnouts tamping and stabilising machine	XCDW-32	A double-sleeper tamping machine used to carry out track lifting, lining, tamping and stabilising operations on turnouts. It can also be used to carry out continuous operations on main railway lines. It can reach an operational efficiency of 1.8 km/h.
<b>Stabilisation machine series</b>	Stabilising machine	WD-320	A stabilising machine used for main railway lines. CRCCE also produces high-altitude, wide-gauge and narrow-gauge specification types for this machine.
	Turnouts stabilising machine	WD-320	A stabilising machine used for turnouts. It can also be used to carry out stabilising operations on main railway lines, normal single turnouts, symmetrical double turnouts and single crossovers. CRCCE also produces high-altitude, wide-gauge and narrow-gauge specification types of this machine.
<b>Ballast cleaning machine series</b>	Undercutter ballast cleaning machine	QS-650	A ballast cleaning machine for main railway lines, with an operational efficiency of up to 650 cu.m./h. It is able to carry out full cleaning operations on tracks with mud pumping defects. CRCCE also produces a high-altitude specification type of this machine.
	Undercutter ballast cleaning machine	QS-1200	A ballast cleaning machine for main railway lines, with an operational efficiency of up to 1,200 cu.m./h. Equipped with the capability to supply new ballasts, it is able to carry out full cleaning operations and new ballast supply operations on tracks with mud pumping defects.
	Turnouts undercutter ballast cleaning machine	CQS-550	A specialised ballast cleaning machine for turnouts, with an operational efficiency of up to 550 cu.m./h. This machine is also suitable for main railway lines.
	Shoulder ballast cleaning machine	BS-550	A specialised ballast cleaning machine that cleans shoulder ballasts. Such cleaning operations are usually carried out in between two overhaul cycles and are targeted at shoulders with heavy fouling and poor drainage, to reduce damage to the track bed and extend the overhaul cycle. It has an operational efficiency of up to 550 cu.m./h.
<b>Ballast regulator series</b>	Bi-directional ballast regulator	SPZ-200	A two-axis ballast regulator. CRCCE also produces high-altitude, wide-gauge and narrow-gauge specification types of this machine.
	Four-axis ballast regulator	DPZ-440	A four-axis ballast regulator. It is able to sweep and collect the ballast left behind on the sleepers and the fasteners after an operation, which can be fed back to the track bed, where a small amount of ballast is required, achieving an economical utilisation of a ballast. CRCCE also produces high-altitude, wide-gauge and narrow-gauge specification types of this machine.
<b>Materials logistics machine series</b>	Material conveyer	WY-100	An eight-axis material conveyer without driving power.
	Material conveyer	WY-100III	A six-axis material conveyer with or without driving power. Those with driving power are further categorised into two-axis and four-axis conveyers. CRCCE also produces a high-altitude specification type of this machine.

Source: Company data



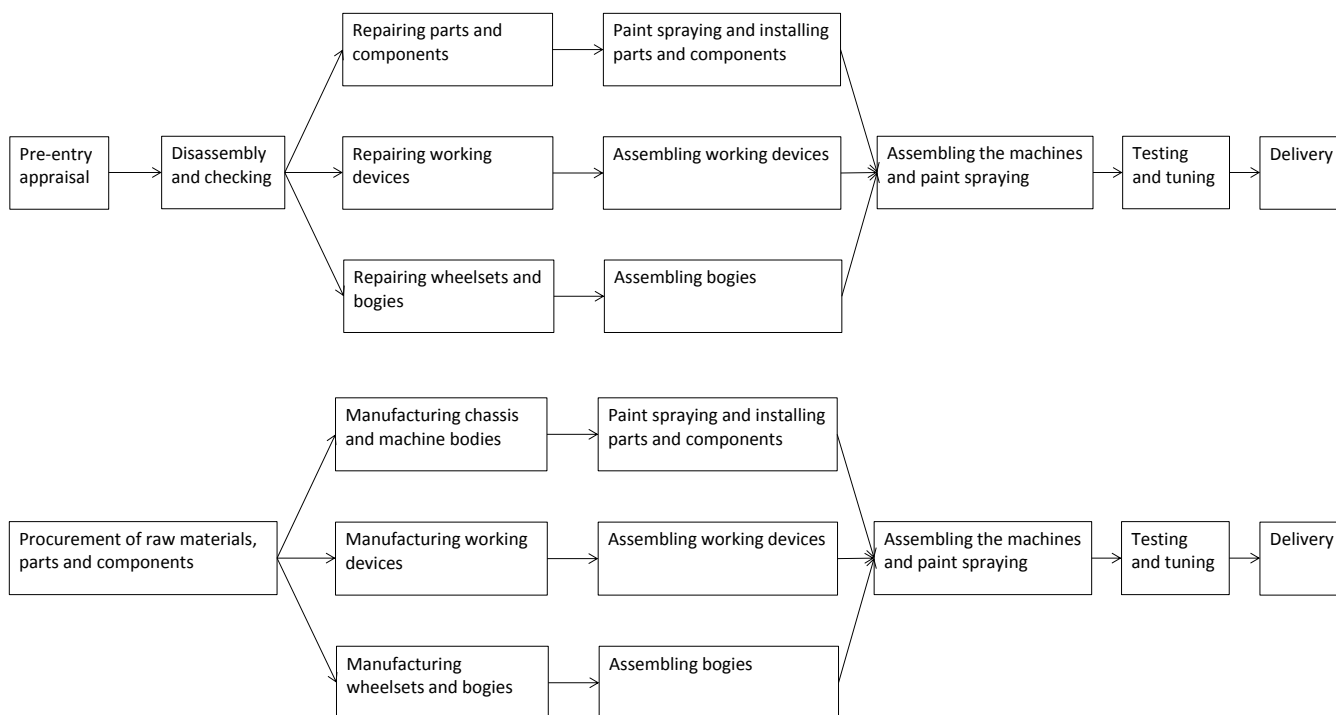
Figure 36: Product description - Contn'd

Product series	Type	Model number	Product description
<b>Rail processing machine series</b>	Rail milling machine	XM-1800	A technologically advanced new rail re-profiling machine. It is digitally controlled and utilises various milling tools to shape and mill the rail and remove the surface material of the rail, in order to remove the rail defects in one pass.
	Turnouts grinding machine	CMC-16	A specialised machine used for the grinding of turnouts. It can also be used for the grinding of main railway lines, and will require several passes of grinding to complete the rail maintenance operation.
	Mobile flash-butt rail welding machine	YHG-1200	A specialised, fully automatic, digitally controlled rail welding machine. It uses a momentary short circuit between the positive and negative polarity, converting electrical energy to heat energy to generate a high temperature arc to melt the steel rail and carry out the welding operation. Automatic centring of running edges and pressure-holding shearing are available.
	Digitally controlled gas pressure rail welding machine	YHGO-1200	A specialised, fully automatic, digitally controlled track welding machine. It uses oxy-acetylene flames to melt the steel rail in order to carry out the welding. Automatic centring of running edges and pressure-holding shearing are available. This machine is especially suited for high-altitude track welding.
<b>Other machinery</b>	Catenary inspection and maintenance vehicle	JDZ-160	With a maximum speed of up to 160km/h, it can rapidly arrive at the work site to carry out integrated inspection overhaul, maintenance and first-aid repair of the catenary. This machine is also known as the catenary ambulance.
	Track snow remover	GCX-1000	A powerful, specialised machine that mechanically removes snow from the surface of the track using air blower and snow suction units, with a maximum snow removal capability of 10,000 cu.m./h. The machine can also be used as a track tractor, and has a maximum speed of up to 120km/h.
	Track sewage suction machine	TX-65	A specialised machine that mechanically cleans the sewage from the surface of the track using air blower and sewage suction units. It is able to suck up the dust, soil particles and pebbles that have accumulated on the surface of the track beds of main railway lines, bridges and tunnels, in order to prevent such sewage from being drawn up by the high-speed train and damaging the bottom of the train and polluting the environment. This ensures the safe operation of the high-speed railway.
	Track measurement machine	GZC-120	A measuring machine used to measure and calculate the relative geometry parameters of the fixed points from the track axis. Such measurement data can be used by the tamping machines directly, and can also be provided to railway administration, in order to provide accurate data to carry out the maintenance and overhaul of tracks.
	Bridge inspection machine	QJ-280	A self-propelled inspection machine for bridge, tunnel and aerial operations. It has a large working area. Its crane jib is able to reach down to 13.5m below and up to 24.5m above the track surface and levelly 21m away from the track axis, enabling it to carry out inspections and maintenance of bridges and their accessory equipment.

Source: Company data



Figure 37: Large railway track maintenance machinery refurbishment and manufacturing processes



Source: Company data

## Relationship with its parent company – CRCC (1186.HK)

CRCC is 100%-owned by China Railway Construction Corporation Limited (CRCC), a joint stock limited company incorporated in the PRC on 5 November 2007, and its four wholly-owned subsidiaries. 55.73% of CRCC's shares are currently held by CRCCG, which is wholly and directly owned by SASAC of the State Council. CRCC was listed on the Main Board of the Hong Kong Stock Exchange on 13 March 2008 (stock code: 1186.HK). CRCC is the largest railway construction company in China in terms of 2015 new contract wins. It is an integrated construction group that encompasses infrastructure construction, survey, design and consultancy services, manufacturing, property development, logistics and materials trading, and other businesses.

CRCC is CRCC's client. The aggregate amounts with respect to the sales of large railway track maintenance machinery, accessories and other related services by CRCC to CRCC and its associates were Rmb47.8m, Rmb78m and Rmb73.3m in 2013, 2014 and 2015, respectively. This represented 1.5-2.2% of CRCC's total revenue during 2013-15, indicating a low business dependence on its controlling shareholder. The balances of trade and bills receivable due from CRCC's fellow subsidiaries were Rmb79.3m, Rmb80.9m and Rmb109m at the end of 2013, 2014 and 2015, respectively, accounting for 17.8%, 14.6% and 6.5% of CRCC's total trade and bill receivables.



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## Relationship with global market leader – Plasser & Theurer

CRCCE has entered into several 13-year cooperation agreements with Plasser & Theurer, the global leader of large railway track maintenance machinery manufacturing. Those agreements entitled CRCCE to use certain IP rights and technologies and to manufacture and sell 13 out of 40 types of large railway track maintenance machines (five types have expired and eight types will expire in the next 13 years). Sales derived from these 13 types of machines accounted for 36%-60% of CRCCE's total sales in 2012-2015. In exchange for this, the company has agreed to purchase parts and components from Plasser & Theurer, which are worth a specific percentage of estimated production value. During 2013-15, parts and components procured from Plasser & Theurer represented 18-20% of its total purchase cost of raw materials and parts and components. However, these agreements have prohibited CRCCE from exporting relevant products to certain countries and jurisdictions.



# Appendix B: the Chinese large railway track maintenance machinery industry

## Industry history

### From 1949 to 1990

China's railway track maintenance work was mainly conducted manually. However, this method became inefficient and obsolete with the rapid development of China's railway network from 1980 to 1990.

### From 1990 to 2000

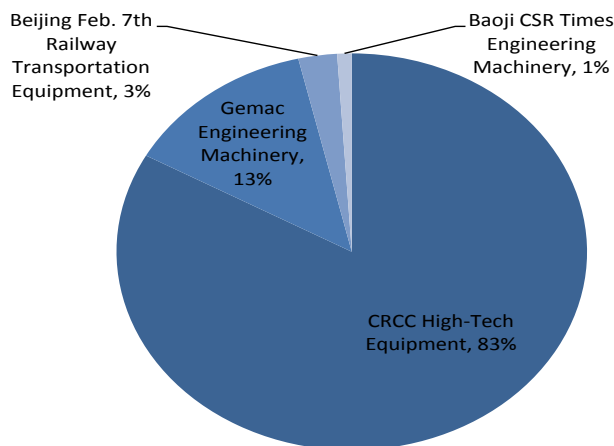
China's railway track maintenance machinery industry (led by CRCCE) started to import products and technology from overseas industry leaders. Meanwhile, the former MOR launched the manufacturing of large railway track maintenance machinery domestically.

### From 2000 to date

The industry started the absorption of advanced large railway track maintenance machinery technology, and made its own innovations. Domestic manufacturers strengthened ties with research institutions and launched high-quality machines specifically suitable to China railway transport systems.

## Highly consolidated industry

Figure 38: Market share of China large railway track maintenance machinery industry in 2014



Source: China Insights Consultancy



*The author of this report wants to express appreciation to Frank Zhu, who is employed by Evalueserve Shanghai and contributed to this report.*



# Appendix 1

## Important Disclosures

Additional information available upon request

### Disclosure checklist

Company	Ticker	Recent price*	Disclosure
CRCC High-Tech	1786.HK	3.44 (HKD) 24 Jun 16	1,7

\*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at <http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr>.

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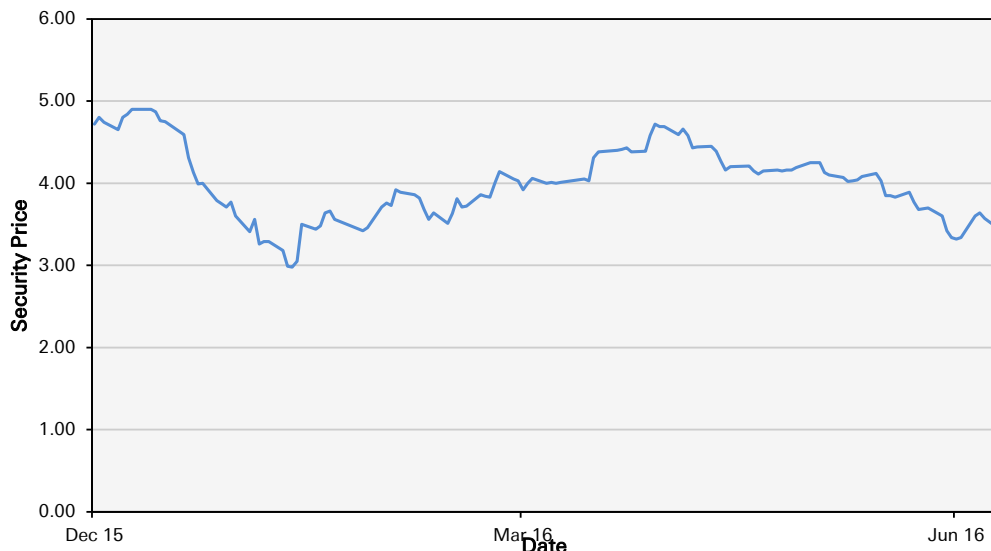
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Historical recommendations and target price: CRCC High-Tech (1786.HK)

(as of 6/24/2016)



Previous Recommendations

- Strong Buy
- Buy
- Market Perform
- Underperform
- Not Rated
- Suspended Rating

Current Recommendations

- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

\*New Recommendation Structure as of September 9,2002

\*\*Analyst is no longer at Deutsche Bank

Equity rating key

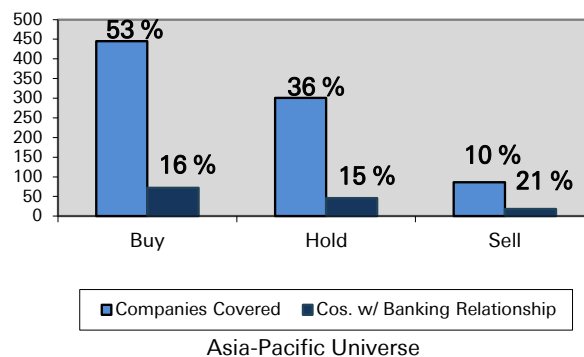
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