



China railway equipment

A comparison between standardized MUs “CR” (复兴号) and “CRH” (和谐号)

	Ticker	Rec	Mkt cap		Price	PT	Up/ dn (%)	PER		PBR		ROE	
			(US\$m)	Ccy				2017E	2018E	2017E	2018E	2017E	2018E
CRRC	1766 HK	Buy	39,788	HKD	7.11	9.50	+33.6	13.1	11.4	1.5	1.4	11.9	12.4
Zhuzhou CRRC	3898 HK	Buy	5,870	HKD	38.80	44.90	+15.7	12.6	11.2	2.1	1.8	18.3	17.7

Source: Company data, CSCI estimates

- The China Standardized High-speed railway multiple units (MUs) has officially put on business stream from 26th June, which symbolizes China has achieved the target of HSR MU localization.
- Between 26th and 30th June, two pairs of MUs, G123/156 and G155/124, will be put into service on the “Beijing-Shanghai HSR line”, to be followed by four pairs from 1st July onwards. Looking forward, we expect China standardised “CR” mode to gradually replace the current “CRH” mode.
- While will unlikely be a major catalyst for China’s railway equipment plays (CRRC (1776 HK, Buy) and HK-listed Zhuzhou CRRC (3898 HK, Buy)) in the near term, the localisation of MUs would have a far-reaching impetus on the industry, in particular Zhuzhou CRRC, in our view.

The history of “CRH” series HSR MUs. China’s HSR MU (“CRH” series) technology was originally developed from 2004, primarily based on the modes from four foreign tendering attendees, Bombardier, Kawasaki, Alstom and Siemens, with the cooperation in the form of “Associates & JV” under the old CSR/CNR entity (Qingdao Sifang, Tangshan, Puzhen, etc.), in order to absorb the key traction power tech from overseas. The “CRH” series officially commenced operation in 2007, when China launched the 6th railway speed acceleration. We have listed the evolutionary history of the “CRH” mode as follow:

- Bombardier Regina C2008 → CRH1 → CRH380D
- Kawasaki E2-1000 → CRH2 → CRH380A
- Siemens ICE3 → CRH3 → CRH380B and CRH380C
- Alstom Pendolino → CRH5 → CJ1

What’s the rationale for China localize MUs? After almost 10 years business service with “CRH”, China’s HSR industry has reached splendid achievement, with no.1 HSR country in the world. However, China is still striving for its domestic HSR brand internationalization, especially with fully localization of its train manufacturer and key components supplier. Furthermore, some operational problems still need to be solved from the previous 10-years experiences, such as the refurbishment problems within different “CRH” modes (As different CRH mode cannot be replacement if the train bogs down halfway on the tracks, mainly due to different original mode).

What are the differences between “CRH” and “CR”? (See Page 2 for details). The switch from “CRH” to “CR” has led to various improvements, including: 1) Maximum speed increased to 400km/h, surpassing that of HSR; 2) Freeing up more space as height increased from 3.7m to 4.05m, optimising the feeling of comfort; 3) lower traction power usage with electricity cost saving of c.17% as compared with the previous mode at the speed of 350km/h; 4) longer service life of 30 years vs. 20 years for “CRH”; 5) localisation, which has reduced production costs, made it more price-competitive in the international market.

SUN Lingxiao, Roger

(CE No.: AXO391)

rogersun@csci.hk

+852 3465 5785

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Figure 1: Comparison of different HSR modes

	Original mode	Production site	Production year	Size	Maxim speed	Operating speed	Traction power	Power mode
CRH1	Bombardier Regina C2008	Bombardier Sifang (Qingdao) Transportation Ltd.	2006-2015	26,600mm* 3,328mm* 4,040mm	250km/h	205-250km/h	CRH1A:5300kw; CRH1B:11,000kw	CRH1A: 5M3T; CRH1B/E: 10M6T
CRH2	Kawasaki Shinkansen E2-1000 MU	CRCC Qingdao Sifang Co., Ltd.	2005-2016	25,000mm* 3,380mm* 3,700mm	370km/h	250-350km/h	CRH2A:4800kw; CRH2B:9600kw; CRH2C:7200kw	CRH2A/G/J: 4M4T; CRH2B/E: 8M8T; CRH2C: 6M2T
CRH3	Siemens ICE3	CRRC Tangshan Railway Vehicles Co., Ltd.	2007-2014	25,000mm* 3,265mm* 3,890mm	350km/h	350km/h	8800kw	4M4T
CRH5	Alstom Pendolino MU	CRRC Changchun Railway Vehicles Co., Ltd.	2006-2016	25,000mm* 3,200mm* 4,270mm	250km/h	250km/h	5,500kw	5M3T
CRH6	Independent R&D	CRRC Nanjing Puzhen Co., Ltd.	2012-	24,500mm* 3,300mm* 3,860mm	CRH6A: 220 km/h; CRH6F: 176 km/h; CRH6S: 160 km/h	CRH6A: 200 km/h; CRH6F: 160 km/h; CRH6S: 140 km/h	CRH6A: 5,520 kW; CRH6F: 5,152 kW; CRH6S: 2,200 kW	4M4T
CJ1	Independent R&D; CRH5	CRRC Changchun Railway Vehicles Co., Ltd.	2013-	24,500mm* 3,300mm* 3,900mm	250km/h	250km/h	5,120kw	4M4T
CRH380A	Independent R&D	CRRC Qingdao Sifang	CRH380A: 2010-2011; CRH380A(統型): 2013; CRH380AL: 2010-2013	25,000mm* 3,380mm* 3,700mm	380km/h	350km/h	380A: 9,600kw; 380AL: 21,560kw	CRH380A/CRH380A(統型); 6M2T;CRH380AL: 14M2T
CRH380B	Independent R&D	CRRC Tangshan Railway Vehicles Co., Ltd. And CRRC Changke	CRH380BG: 2012-2015; CRH380B: 2013-2016; CRH380BL: 2010-2013, 2015-2017	24,825mm* 3,265mm* 3,890mm	380km/h	350km/h	380A: 9,376kw; 380AL: 18,752kw	CRH380BG/CRH380A(統型); 4M4T;CRH380BL: 8M8T
CRH380C	Independent R&D	CRRC Changchun Railway Vehicles Co., Ltd.	2011-2013	24,825mm* 3,265mm* 3,890mm	380km/h	350km/h	380CL: 19,200kw	CRH380CL: 8M8T
CRH380D	Independent R&D	CRRC Qingdao Sifang	2010-2016	24,825mm* 3,265mm* 3,890mm	380km/h	350km/h	380CL: 19,200kw	4M4T
CR400A/B	China standardized MU	CRRC Qingdao Sifang and Changchun Railway Vehicles Co., Ltd.	2015 (test); 2016-	25,000mm* 3,360mm* 4,050mm	400km/h	350km/h	10,400kw	4M4T

Source: CSCI Research

Figure 2: Definition on the letters of HSR code

Letter	Speed (km/h)	Group type	Representative vehicle
A	200-250	8 units	CRH1A, CRH2A, CRH5A, CRH6A
B	200-250	16 units	CRH1B, CRH2B
C	300-350	8 units	CRH2C, CRH3C
D	300-350	16 units	
E	200-250	16 units, sleeper	CRH1E, CRH2E
F	160	8 units, inter-city	CRH6F
G	200-250	8 units, cold-resistance	CRH2G, CRH5G
H	200-250	8 units, cold/wind-resistance	
S	140	4 units, inter-city	CRH6S

Source: CSCI Research

Figure 3: Definition on the letters of HSR code

Letter	Group type	Representative vehicle
-	8 units	CRH380A, CRH380B, CRH380C, CRH380D
G	8 units, cold-resistance	CRH380BG
H	8 units, cold/wind-resistance	
L	16 units	CRH380AL, CRH380BL, CRH380CL, CRH380DL

Source: CSCI Research

Figure 4: Bombardier Regina C2008→CRH1 →CRH380D



Source: Google

Figure 5: Kawasaki E2-1000→CRH2→CRH380A



Source: Google

Figure 6: Siemens ICE3→CRH3→CRH380B and CRH380C



Source: Google

Figure 7: Alstom Pendolino→CRH5→CJ1



Source: Google

Figure 8: Peers valuation

Company name	Code	Ccy	Close (Local)	Mkt cap (US\$m)	Rep'tg Ccy	Fiscal Y/E	PER (x)		PBR (x)		EPS Growth (%)		ROE (%)		Gross Margin (%)		Net Gearing (%)		EV/EBITDA (x)		Yield (%)	
							17E	18E	17E	18E	17E	18E	17E	18E	17E	18E	17E	18E	17E	18E	17E	18E
Railway Equipment and components																						
CRRC LTD-H	1766 HK	HKD	7.08	39,628	CNY	Dec	13.7	12.4	1.5	1.4	6.4	10.4	11.1	11.8	20.1	20.3	(12.0)	(18.2)	12.5	11.5	2.7	3.1
ZHUCHOU CRRC TH	3898 HK	HKD	39.05	5,885	CNY	Dec	12.5	11.2	2.2	1.9	10.6	11.1	18.7	18.4	38.1	38.2	(19.0)	(25.1)	9.8	8.9	1.5	1.8
HOLLYSYS AUTOMAT	HOLLI US	USD	16.98	1,024	USD	Jun	12.0	9.2	1.3	1.2	(24.9)	31.1	11.6	13.1	34.3	35.7	(34.2)	(34.3)	10.5	8.0	0.8	1.0
CHINA RAILWAY-H	3969 HK	HKD	6.17	6,968	CNY	Dec	12.9	10.9	1.9	1.7	18.7	18.1	15.5	16.8	25.4	25.2	(60.9)	(60.5)	7.0	5.9	1.9	2.3
Average							12.8	10.9	1.7	1.5	2.7	17.7	14.2	15.0	23.5	23.9	(31.5)	(34.5)	10.0	8.6	1.7	2.0
Median							12.7	11.1	1.7	1.5	8.5	14.6	13.5	14.9	29.9	30.4	(26.6)	(29.7)	10.2	8.4	1.7	2.0
Railway Operators																						
GUANGSHEN RAIL-H	525 HK	HKD	3.96	4,518	CNY	Dec	17.9	15.4	0.9	0.8	3.2	16.5	4.9	5.3	11.8	12.4	(8.1)	(12.2)	8.5	7.9	2.7	3.2
DAQIN RAILWAY-A	601008 CH	CNY	8.29	18,012	CNY	Dec	11.6	10.9	1.3	1.2	51.4	8.6	11.4	11.6	25.2	25.6	(2.4)	(5.7)	7.0	6.8	4.4	4.7
MTR CORP	66 HK	HKD	44.10	33,434	HKD	Dec	28.1	27.1	1.8	1.8	0.1	3.6	6.4	7.0	41.6	42.6	(19.9)	(25.4)	16.3	16.2	7.0	2.6
CAN NATL RAILWAY	CNR CN	CAD	107.01	61,146	CAD	Dec	20.9	19.1	5.2	4.9	11.9	9.5	25.0	25.8	n.a.	n.a.	79.4	74.3	13.0	12.3	1.5	1.7
CANADIAN PACIFIC	CP CN	CAD	210.87	23,350	CAD	Dec	18.3	16.3	5.1	4.6	11.0	12.6	33.4	34.5	n.a.	n.a.	165.3	139.7	11.4	10.9	1.0	1.1
CSX CORP	CSX US	USD	53.12	49,010	USD	Dec	23.3	19.3	4.0	3.8	25.9	20.4	17.3	20.7	32.0	33.0	90.5	92.9	11.4	10.3	1.5	1.6
KANSAS CITY SOUT	KSU US	USD	102.79	10,904	USD	Dec	20.2	18.0	2.5	2.3	13.5	12.3	12.4	13.2	n.a.	n.a.	59.5	57.3	11.1	10.4	1.3	1.4
NORFOLK SOUTHERN	NSC US	USD	119.48	34,623	USD	Dec	19.6	17.0	2.8	2.6	13.7	10.8	14.4	15.2	32.0	33.0	72.5	71.7	9.9	9.3	2.0	2.1
UNION PAC CORP	UNP US	USD	108.03	87,228	USD	Dec	18.8	16.8	4.5	4.4	14.8	12.2	22.7	25.4	38.1	39.0	74.6	83.3	10.1	9.4	2.3	2.4
CENTRAL JAPAN RL	9022 JP	JPY	18,380.00	33,833	JPY	Mar	9.9	9.8	1.4	1.2	10.1	0.7	14.9	13.0	78.3	n.a.	77.6	140.2	6.3	6.2	0.7	0.8
EAST JAPAN RAIL	9020 JP	JPY	10,995.00	38,259	JPY	Mar	15.8	14.7	1.6	1.5	7.1	7.7	10.7	10.6	91.5	91.3	111.3	102.3	8.9	8.6	1.2	1.3
WEST JAPAN RAIL	9021 JP	JPY	8,115.00	14,048	JPY	Mar	15.4	14.1	1.6	1.5	5.4	9.8	11.3	11.5	12.4	n.a.	105.8	89.3	7.9	7.6	1.7	1.9
Average							18.3	16.5	2.7	2.6	14.0	10.2	15.4	16.1	40.3	39.6	70.2	71.0	10.2	9.6	2.3	2.1
Median							18.5	16.5	2.1	2.0	11.4	10.3	13.4	13.1	32.0	33.0	76.1	78.8	10.0	9.4	1.6	1.8
Overseas heavy equipment																						
ABB LTD-REG	ABBN VX	CHF	24.63	56,121	USD	Dec	20.3	18.1	3.9	3.9	9.7	12.5	18.9	20.6	30.3	30.6	10.6	6.9	11.3	10.34	3.09	3.2
ALSTOM	ALO FP	EUR	31.97	3,866	EUR	Mar	21.5	20.0	2.0	1.8	87.7	7.9	8.1	8.9	15.3	15.6	3.4	4.7	12.7	11.54	0.96	1.3
BOMBARDIER INC-B	BDDB CN	CAD	2.44	4,146	USD	Dec	(96.9)	27.1	(0.8)	(1.0)	(81.4)	(457.9)	7.1	(1.4)	11.4	12.0	(165.3)	(171.1)	12.5	8.85	n.a.	0.1
KAWASAKI HVY IND	7012 JP	JPY	320.00	4,778	JPY	Mar	22.1	14.4	1.2	1.2	(46.6)	53.3	6.0	8.3	16.0	16.8	82.4	73.0	9.4	7.93	1.99	2.1
SIEMENS AG-REG	SIE GY	EUR	125.90	119,718	EUR	Jun	15.6	14.7	2.6	2.5	13.4	5.7	17.7	17.4	30.7	30.6	52.7	43.5	11.0	10.26	3.08	3.2
Average							(3.9)	18.9	1.8	1.7	(3.6)	(25.7)	11.6	10.8	28.7	21.1	(3.3)	(6.6)	11.4	8.8	2.3	2.9
Median							20.3	18.1	2.0	1.8	9.7	7.9	8.1	8.9	16.0	16.8	10.6	6.8	11.3	10.3	2.5	2.1
Construction Companies Valuation																						
H shares																						
CHINA RAILWAY CONSTRUCTION-H	1166 HK	HKD	10.40	22,892	CNY	Dec	7.0	6.3	0.9	0.8	10.3	10.2	11.4	11.4	9.1	9.1	27.4	28.3	7.3	6.6	2.3	2.5
CHINA RAILWAY GROUP LTD-H	601390 CH	HKD	6.21	27,101	CNY	Dec	7.9	7.1	0.9	0.8	2.9	11.0	9.9	10.0	8.2	8.3	51.2	46.5	9.7	8.0	2.1	2.3
CHINA COMMUNICATIONS CONST-H	1800 HK	HKD	10.28	31,880	CNY	Dec	6.7	5.9	0.9	0.8	11.4	12.2	11.6	11.8	13.7	13.7	114.7	111.0	9.9	9.0	3.0	3.4
METALLURGICAL CORP OF CHN-H	1618 HK	HKD	2.67	13,898	CNY	Dec	6.9	5.4	0.7	0.6	17.4	27.9	9.2	10.6	13.3	13.3	n.a.	n.a.	14.7	12.6	3.4	4.1
CHINA STATE CONSTRUCTION INT	3211 HK	HKD	12.54	7,216	HKD	Dec	9.8	8.1	1.9	1.6	29.5	21.0	20.2	20.8	13.9	14.3	26.6	24.6	9.5	8.0	3.0	3.6
SINCEP ENGINEERING GROUP-H	2386 HK	HKD	7.00	3,974	CNY	Dec	9.8	8.4	1.0	1.0	24.4	17.5	9.1	10.4	12.1	13.3	(51.6)	(63.5)	4.0	3.4	4.0	4.6
CHINA MACHINERY ENGINEERIN-H	1828 HK	HKD	5.88	3,110	CNY	Dec	8.9	7.9	1.3	1.2	7.6	13.0	13.6	13.8	16.8	17.1	(117.3)	(114.4)	n.a.	n.a.	4.7	5.3
Average							8.1	7.0	1.1	1.0	14.8	16.1	12.1	12.7	12.4	12.7	10.2	7.6	9.2	8.12	3.22	3.7
Median							7.9	7.1	0.9	0.8	11.4	13.0	11.4	11.4	13.3	13.3	32.0	31.4	9.6	8.51	3.02	3.6
A Shares																						
CHINA RAILWAY CONSTRUCTION-A	601186 CH	CNY	11.97	22,892	CNY	Dec	10.2	9.2	1.1	1.0	12.2	10.5	11.4	11.5	9.3	9.3	33.3	36.3	7.5	6.8	1.5	1.6
CHINA RAILWAY GROUP LTD-A	601390 CH	CNY	8.72	27,101	CNY	Dec	14.1	12.7	1.4	1.3	3.7	11.0	10.4	9.6	9.6	58.2	57.9	9.8	8.9	1.1	1.2	
CHINA COMMUNICATIONS CONST-A	601800 CH	CNY	15.17	31,880	CNY	Dec	12.9	11.2	1.4	1.3	9.0	15.4	11.7	12.1	14.2	14.1	245.2	180.8	10.0	8.9	1.4	1.6
METALLURGICAL CORP OF CHN-A	601618 CH	CNY	4.96	13,898	CNY	Dec	15.7	13.5	1.5	1.4	14.5	16.8	9.4	10.4	12.7	12.7	n.a.	n.a.	13.8	12.2	1.8	2.0
CHINA STATE CONSTRUCTION A	601688 CH	CNY	9.70	42,572	CNY	Dec	8.4	7.4	1.4	1.2	10.5	12.8	17.0	16.7	10.6	10.7	n.a.	n.a.	6.6	6.0	2.6	3.0
SHANGHAI TUNNEL ENGINEERIN-A	600820 CH	CNY	10.00	4,695	CNY	Dec	16.2	14.2	1.6	1.5	14.5	13.8	10.1	10.5	12.4	12.6	n.a.	n.a.	10.5	9.4	1.7	1.7
CHINA NATIONAL A	601117 CH	CNY	6.64	4,787	CNY	Dec	12.7	10.9	1.1	1.0	11.7	16.2	9.1	9.9	14.0	14.1	n.a.	n.a.	5.4	4.7	1.5	1.7
Average							12.9	11.3	1.4	1.2	10.9	13.8	11.3	11.6	11.8	11.9	112.2	91.7	9.1	8.1	1.7	1.8
Median							12.9	11.2	1.4	1.3	11.7	13.8	10.1	10.5	12.4	12.6	58.2	57.9	9.8	8.9	1.5	1.7
Asian																						
DAEWOO ENG & CON	047040 KS	KRW	6,790.00	2,484	KRW	Dec	5.8	6.3	1.1	0.9	320.7	(8.0)	21.4	16.1	11.1	10.8	67.0	48.9	4.4	4.6	n.a.	n.a.
GS ENGINEERING	006390 KS	KRW	29,350.00	1,845	KRW	Dec	11.6	7.2	0.6	0.6	452.6	60.6	5.5	8.2	6.9	7.9	20.3	9.7	7.5	6.2	0.6	0.7
HYUNDAI ENG&CONS	000720 KS	KRW	44,800.00	4,390	KRW	Dec	9.2	8.0	0.7	0.7	21.2	15.4	8.5	9.0	10.3	10.2	(19.1)	(27.5)	3.8	3.6	1.2	1.2
DAELIM INDUS CO	000210 KS	KRW	85,000.00	2,803	KRW	Dec	6.7	7.0	0.6	0.6	35.6	(4.8)	9.6	8.6	10.6	10.7	14.0	8.3	6.3	6.0	0.4	0.4
SAMSUNG ENGINEER	008950 KS	KRW	11,700.00	2,018	KRW	Dec	24.5	12.6	2.0	1.8	28.1	94.9	8.7	15.0	8.9	9.7	50.0	35.8	13.3	9.8	—	—
SHIMIZU CORP	1803 JP	JPY	1,209.00	8,519	JPY	Mar	10.7	11.1	n.a.	n.a.	53.7	(3.0)	16.7	13.8	12.8	12.5	19.2	7.8	7.3	7.3	1.8	1.9
NISHIMATSU CONST	1820 JP	JPY	699.00	1,513	JPY	Mar	9.1	9.3	1.7	1.5	25.9	(2.4)	11.2	10.4	13.2	13.5	n.a.	n.a.	n.a.	n.a.	2.9	3.1
TODA CORP	1860 JP	JPY	713.00	2,056	JPY	Mar	5.5	10.9	1.0	0.9	93.9	(49.8)	2									



Research

LIU Taisheng, Steven
TMT
(852) 3465 5652
stevenliu@csci.hk

SO Lai Shan, Jennifer
Consumer
(852) 3465 5781
jenniferso@csci.hk

CHAN Ka Yeung, Duncan
Commodity
(852) 3465 5654
duncanchan@csci.hk

TIAN Yang
Automotive
(852) 3465 5775
tianyong@csci.hk

SUN Lingxiao, Roger
Industrials
(852) 3465 5785
rogersun@csci.hk

XU Bo, Albert
Financials
(852) 3465 5789
albertxu@csci.hk

ZHU Kexin
Renewable energy
(852) 3465 5653
zhukexin@csci.hk

YAO Xue, Snowy
snowyyao@csci.hk
+852 3465 5675

SHEN Xiangfei, Thomas
(852) 3465 8689
thomasshen@csci.hk

XU Qiwen
(852) 3465 8690
xuqiwen@csci.hk

Institutional Sales & Trading

XIANG Xinrong, Ron
(852) 3465 5633
ronxiang@csci.hk

HO Wen Hao, Jack
(852) 3465 5685
jackho@csci.hk

WANG Zhuo, Gary
(852) 3465 8655
wangzhuo@csci.hk

HO Hung Wei
(852) 3465 5687
hohungwei@csci.hk

LEE Ying Ju, Rose
(852) 3465 5707
roselee@csci.hk

LI Jiageng, Mike
(852) 3465 5636
mikeli@csci.hk

XIA Tian
(852) 3465 5670
xiatian@csci.hk

XU Xiaowei, Vincent
(852) 3465 5795
vincentxu@csci.hk

LI Tianyi, Miranda
(852) 3465 8653
mirandali@csci.hk

Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index; Time Horizon: 12 months

Buy	12-month absolute total return: $\geq 10\%$
Hold	12-month absolute total return: $> -10\%$ but $< 10\%$
Sell	12-month absolute total return: $\leq -10\%$

Disclosure of Interests

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China Securities (International) Research

18/F, Two Exchange Square, Central, Hong Kong

Tel: (852) 34655600 Fax: (852) 21809495

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