



2021

环境、社会及管治报告

Environmental, Social and Governance Report

中国铁路通信信号股份有限公司
China Railway Signal & Communication Co.,LTD.

关于本报告

本报告是中国铁路通信信号股份有限公司发布的第九份环境、社会及管治报告，本着客观全面、规范透明的原则，详细阐述 2021 年度公司环境、社会及管治工作的管理理念、亮点实践及年度成效。本报告以中文及英文编制，如有差异，请以中文文本为准。

报告范围

除特殊说明外，本报告涵盖中国铁路通信信号股份有限公司总部、分支机构及附属公司，与《中国铁路通信信号股份有限公司 2021 年年度报告》对外披露范围保持一致。

时间范围为 2021 年 1 月 1 日至 2021 年 12 月 31 日，部分内容超出此范围。

参考标准

全球报告倡议组织《可持续发展报告标准(GRI Standards)》

国务院国资委《关于国有企业更好履行社会责任的指导意见》

中国社会科学院《中国企业社会责任报告指南（CASS-CSR4.0）》

香港联合交易所主板上市规则附录二十七《环境、社会及管治报告指引》

上海证券交易所《上市公司环境信息披露指引》

发布周期

本报告为年度报告，于每年 3-4 月发布。

称谓说明

为便于表达，本报告中提及的“中国通号”“公司”“我们”等均指代“中国铁路通信信号股份有限公司”。

数据说明

本报告关键财务绩效来自《中国铁路通信信号股份有限公司 2021 年年度报告》，其他数据来自公司内部管理体系。

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About this Report

This Report is the ninth Environmental, Social and Governance Report of China Railway Signal & Communication Co.,Ltd. Based on objective, comprehensive, regulative and transparent principles, this Report expounds management ideas, key practices and annual achievements for environmental, social and governance work of China Railway Signal & Communication Co., Ltd. in 2021.This Report is compiled in Chinese and English versions. Should there be any minor content difference, the Chinese version prevails.

Scope of the Report

Unless otherwise stated, this Report includes China Railway Signal & Communication Co., Ltd.'s headquarters, all its branches and subsidiaries, with the same scope of 2021 CRSC Annual Report.

The reporting period is from January 1, 2021 to December 31, 2021. Some contents are sourced from historical data.

Reference Standards

The Sustainability Reporting Standards issued by the Global Reporting Initiative (GRI)

The Guidelines on Enterprises to Better Perform Social Responsibility by State-owned Assets Supervision and Administration Commission of the State Council (SASAC)

The Chinese Corporate Social Responsibility Report Preparation Guide by the Chinese Academy of Social Sciences (CASS-CSR4.0)

Appendix 27 Environmental, Social and Governance Reporting Guide of the Rules Governing the Listing of Securities on HKEX (Listing Rules)

The Guidelines on Environmental Information Disclosure of Listed Companies issued by Shanghai Stock Exchange

Reporting Cycle

This is an annual report released in March or April.

Reporting Specification

For the convenience of expression, “China Railway Signal & Communication Co., Ltd.” may be expressed as “CRSC”, the “Company” and “We”.

Data Specification

All key financial performance data disclosed in this Report are collected from China Railway Signal & Communication Co., Ltd.'s 2021 Annual Report, and other data are mainly sourced from internal management systems of the Group.

Reliability Guarantee

The board of directors of the Company promises to supervise the content of the Report to ensure that there are no false records, misleading statements or major omissions.

Access to the Report

This Report is provided in Chinese and English versions. You may browse or download the Report at the official website of CRSC (Culture & Responsibility - Social Responsibility) or at the website of Hong Kong Exchanges.

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董事长致辞

Chairman's Statement



董事长：周志亮 Chairman: Zhou Zhiliang

2021 年是党和国家历史上具有里程碑意义的一年，是中国共产党成立 100 周年，也是实施“十四五”规划、实现第一个百年奋斗目标的一年。中国通号坚决贯彻落实党中央、国务院决策部署，牢记“国之大者”，攻坚克难、拼搏奋进，市场经营稳中有进，科技实力持续提升，安全质量持续向好，推动全面高质量发展迈出坚实步伐，实现“十四五”发展良好开局。

As a milestone year in the history of the party and the country, 2021 was the 100th anniversary of the founding of the Communist Party of China, and also the year to implement the "14th Five-Year Plan" and achieve the first centenary goal. CRSC resolutely implemented the decisions and arrangements made by the CPC Central Committee and the State Council, bear in mind "The Top Priorities of the Country", overcame difficulties and strove to forge ahead. In 2021, we stably continued to promote the market operation, R&D strength, and safety & quality, taking solid steps to all-round high-quality development and achieving a good start to the development of the "14th Five-Year Plan".

我们坚持稳中求进，经济质量稳中提升。中国通号综合国内国际宏观经济形势、国家政策要求和行业发展态势，抢抓机遇、乘势而上，坚持“一业为主、相关多元”，强化战略引领，优化资源配置，构筑发展新优势，在突出主责主业的基础上寻求增量发展，以新的增量更好支撑主责主业发展，实现企业发展质量、效率和效益提升。2021 年，营业收入 383.58 亿元，净利润 36.93 亿元。

Our economic quality has grown steadily as we insist on making progress while maintaining stability. CRSC integrated the domestic and international macroeconomic situation, national policies and industry development trends, seized opportunities, took advantage of the trend, adhered to of "Giving Priority to One Major Industry While Developing Other Relevant Ones", strengthened strategic guidance, optimized resource allocation, and built new development advantages. On the basis of the main responsibility and main business, we sought incremental development to better support the main responsibility and main business, realizing the improvement in quality, efficiency and profit. In 2021, the revenue and the net profit of CRSC was 38.358 billion yuan and 3.693 billion yuan respectively.

我们坚定创新驱动，推动高水平科技自立自强。中国通号不断加强关键核心技术攻关，开展前瞻性技术与成果转化，加速数字化智能化转型，以通号科技支撑中国高铁跑得更稳、跑得更快，全年科技投入 20.87 亿元，开展科研项目 772 项。2021 年，自主研发国产芯片投入应用，拥有完全自主知识产权的“安达”操作系统成功上线，成功交付我国首条高原电气化铁路—拉林铁路，自主研发“启骥”列车运行系统在深圳地铁 20 号线投入商用，全国首条磁浮文化旅游项目—凤凰中低速磁悬项目全线试运行。

Our high-level technology has been self-reliance as we are firmly drove by innovation. CRSC continued to tackle down the difficulties of key technologies, conducted the R&D and achievement transformation of insightful technologies, and accelerated digital and intelligent transformation, helping China's high-speed rail to run more stably and faster by CRSC technology. We invested 2.087 billion yuan in science and technology throughout the year and carried out 772 scientific research projects. In 2021, the independently developed chip was put into application, and the "Anda" operating system with completely independent intellectual property rights was successfully launched, and successfully delivered China's first plateau electrified railway - Lhasa-Nyingchi railway, the TRANAVI Qiji operation system was put into commercial use in Shenzhen metro line 20, and China's first maglev cultural railway project, the Fenghuang Maglev Cultural Tourism Project was put into trial operation across the board.

我们夯实品质管理，保障安全质量持续向好。中国通号严把安全关口，坚持“安全立企、质量兴企”战略，以落实企业安全生产主体责任为首要任务，以从根本上消除事故隐患为目标，聚焦安全体系保障、安全技术保障、安全科技保障、安全运营保障精准发力，全系统安全生产治理体系和治理能力现代化水平实现新飞跃。2021年，公司未发生重大质量问题，在轨系统设备安全可靠运行；完成安全认证122项，新研发的安全关键产品和城轨信号系统集成项目100%实行第三方安全评估。

Our safety quality has continued to improve as we consolidated quality management. CRSC continued to emphasize safety, adhere to the strategy of "establishing an enterprise with safety and developing an enterprise with quality", taking the workplace safety as the primary task, and aiming at eliminating hidden dangers. Focusing on system, technology, operation, we made precise efforts to achieve a new leap in the modernization level of the system-wide safety system. In 2021, CRSC had no major quality problems, and on-track system equipment operated safely and reliably. What's more, CRSC completed 122 safety certifications, and all the newly developed safety-critical products and urban rail signal system integration projects were subject to third-party safety assessments.

我们践行低碳发展，加强绿色效能释放。中国通号坚持源头把关和过程控制并重的原则，将绿色发展融入科技研发、生产制造、工程建设等全过程，加快节能低碳新技术、新工艺、新产品的示范与应用推广，降低“三废”和温室气体排放。同时，继续加强与各方的合作，推出海绵城市、地下综合管理综合监控与报警系统、智慧建筑综合应用系统等一系列绿色科技成果，用创新科技共同打造绿色交通解决方案。

Our green performance has been released as we practice low-carbon development. CRSC adhere to the principle of equal emphasis on both source and process control, and integrated the green development into the entire process of R&D, manufacturing and engineering, accelerating the demonstration, application and promotion of new energy-saving technologies, new processes and new products, and reducing the emissions of the "three wastes" and greenhouse gases. At the same time, CRSC continued to strengthen cooperation with all parties, launch a series of green technology achievements such as sponge city, comprehensive underground integrated monitoring and alarm system, smart building integrated application system, etc., and jointly create green transportation solutions with innovative technology.

我们积极响应“一带一路”倡议，推进海外项目高质量建设。中国通号充分发挥设计研发、生产制造、施工安装全产业链“三位一体”优势，深入开拓和创新境外市场高价值链端，持续完善全球业务布局，推动中国高铁“走出去”。2021年，公司完成欧洲列车运行控制系统相关产品匈牙利质量认证，建成我国首个在欧盟国家的高铁列车运行控制系统实验室；“一带一路”标志性工程—中老铁路圆满开通，印尼雅万高铁、老挝泰国二期铁路、泰国复线铁路改造等项目建设稳步推进。

Our overseas projects have been efficiently promoted as we actively responded to the "Belt and Road" Initiative. In 2021, CRSC took full advantage of the "Trinity" advantages of the entire industrial chain of R&D, manufacturing and installation, deeply explored and innovated the high-value market overseas to improve the global business layout, and promote the "go global" of China's high-speed rail. In 2021, we have got the Hungarian quality certification for its train operation control system in Europe, and built China's first EU-based high-speed train operation control system laboratory. Moreover, the landmark project along the "Belt and Road" - the China-Laos Railway has been implemented as scheduled, and the projects of the Jakarta-Bandung high-speed railway in Indonesia, the Laos-Thailand Phase II railway, and the reconstruction of the double-track railway in Thailand have been progressing steadily.

我们践诺可持续发展，积极履行企业社会责任。中国通号围绕促进共同富裕，接续定点帮扶河南省社旗县，统筹推进产业振兴、人才振兴、文化振兴、生态振兴、组织振兴等工作，助力乡村振兴发展，展现中国通号良好社会形象。面对千年一遇特大暴雨，迅速行动，第一时间响应号召、奉献爱心，第一批到达抢险现场，维护人民群众生命和财产安全。面对国内疫情多点散发和境外新冠肺炎疫情严峻复杂，慎终如始抓实抓细各项防控措施，实现疫情防控、生产经营双胜利。

Our role as a socially responsible enterprise has been fulfilled as we honored our commitment to develop sustainably. Focusing on the promotion of common prosperity, CRSC continued to help Sheqi County in Henan Province, and coordinated the promotion of revitalization of industries, skilled workforce, culture, ecology, and organizations, helping rural revitalization and development, and showing CRSC's good social image. In the face of the rare heavy rainstorm, we quickly responded to the natural disaster and offered aid and arrived at the rescue scene as soon as possible to protect the safety of people's lives and properties. Faced with the breakout of COVID-19 epidemic in multiple spots home and abroad, we continued to pay close attention to various prevention and control measures to achieve double successes in epidemic prevention and profit creation.

2022年，将召开党的二十大。中国通号将紧密团结在以习近平同志为核心的党中央周围，高举习近平新时代中国特色社会主义思想伟大旗帜，全面贯彻党的十九大和十九届历次全会精神，牢记“九个必须”，用好“十个坚持”，以高质量发展为主线，锚定“十四五”发展目标，走好自主创新之路，埋头苦干，砥砺奋进，建成以轨道交通控制技术为特色的世界一流企业，更好地回报股东、服务客户，携手利益相关方共同推进经济、社会、环境可持续发展！

In 2022, the 20th Party Congress of CPC will be held. CRSC will unite closely around the CPC Central Committee with President Xi Jinping at its core, hold high the great banner of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, fully implement the spirit of the 19th Party Congress of CPC and all the 19th Plenary Sessions. We will keep in mind the "Nine Musts", make good use of the "Ten Adheres", take high-quality development as the main line, anchor the development goals of the "14th Five-Year Plan". We will take the road of self-reliant innovation and development, work hard, forge ahead, and build a world-class company featuring rail transit control technology. Additionally, we will better return shareholders, serve customers, and join hands with stakeholders to promote the sustainable development of our economy, society and environment!

2021 中国通号十大要闻 CRSC's Top Ten Highlights in 2021

扎实开展党史学习教育 CRSC solidly launched the Party's history learning and education campaign

紧紧围绕学史明理、学史增信、学史崇德、学史力行的总要求，高站位部署、高标准要求、坚持统筹推进，坚持学用结合，坚持效果导向，精心组织实施、有力有序推进，党史学习教育取得显著成效。开展“我为群众办实事”实践活动，解决了一批“急难愁盼”问题，推出一系列惠民便民的实招硬招，采取问题整改销号的方式，确保了“我为群众办实事”实践活动落到实处、取得实效。公司党委书记、董事长周志亮出席中央广播电视总台《对话》栏目《信物百年》讲述号志灯的故事、赓续通号红色血脉，弘扬通号人跟党创业精神，打造民族产业的家国情怀。

Focusing closely on the general requirements of studying history to strengthen faith, conviction, and confidence and practice, CRSC deployed the campaign at high level with high standard, and adhered to overall planning and the combination of learning and use, as well as effect orientation. Party's history learning and education campaign has achieved remarkable results. CRSC carried out the "I Do Practical Things for The Masses" activities, solving numerous "urgent, difficult and worrying" problems. Besides, CRSC introduced a set of practical and tough measures to benefit the people, and adopted the method of rectifying problems to ensure the activities pragmatic and effective. Zhou Zhiliang, CRSC Party Secretary and Chairman, attended the "Centennial Legacy" documentary produced by CCTV column "Dialogue" to share the story of signal lamp with audience, by which CRSC demonstrated the red legacy it inherits, the spirituality it maintains, and the sentiment to build the national industry.

高质量党建引领 企业高质量发展

CRSC maintained the high-quality development via high-quality Party building



中国通号坚持把政治建设摆在首位，把党的领导融入公司治理体系，以党建统领改革发展，不断提升党组织领导力、增强内部凝聚力和创造力，以高质量党建引领保障企业高质量发展。加强董事会建设，100% 实现董事会应建尽建和外部董事占多数，召开董事会建设研讨视频会，提升董事履职能力。公司召开习近平总书记全国国有企业党的建设工作会议重要讲话发表五周年学习座谈会暨党建品牌创建推进会，总结中国通号五年来党的建设工作经验和成效，首批征集 50 个特色党建案例，发布 5 个特色党建品牌，甄选 29 个案例进行集锦汇编，党建品牌建设取得扎实成果。2021 年 7 月，中国通号海外党建经验获驻地中国使馆肯定。

Putting political advancement in the first place, CRSC has integrated leadership of the Party into the corporate governance system, leading reform and development with party building, continuously improving the leadership of the Party, enhancing internal cohesion and creativity, to ensure high-quality development of enterprises via high-quality Party building. The Group continued to construct the board of directors, completing the function of the board of directors and making a majority of directors be independent. The board of directors held seminars on board construction online to improve the ability of directors to perform their duties. The company held a symposium to study General Secretary Xi Jinping's important speech delivered 5 years ago at the State-owned Enterprise Party Building Work Conference, to summarize the achievements and lessons the Group got in the past 5 years. CRSC collected 50 characteristic party building cases in the first batch, released 5 characteristic party building brands, and selected 29 cases for compilation. Therefore, solid results were achieved in Party building brand construction. In July 2021, CRSC's Party building experience in oversea affiliated companies was highly recognized by the local Chinese consulate.

国企改革三年行动成效显著

CRSC's three-year action plan for SOE reform has achieved remarkable results

2021 年
改革三年行动实施方案

改革措施

172 条

完成

147 条

完成率

85%

In 2021, CRSC has completed **147** reform measures of the **172** in the three-year action plan, with a completion rate of **85%**

坚决贯彻习近平总书记关于国企改革的重要指示批示精神，贯彻落实党中央、国务院关于国企改革三年行动的决策部署，加强组织领导，完善工作机制，强化监督考核，扎实推进各项改革举措落实落地，公司改革三年行动实施方案 172 条改革措施完成 147 条，完成率 85%，改革重点领域取得重要成果，改革经验作为先进典型在国资系统进行交流。着力构建市场化经营机制，推行“大部制”，打造“战略+运营管控型”总部，构建上下贯通、协同运转、科学高效的内部组织体系；总部率先实施全员竞聘上岗，5 家二级企业开展经理层及管理人员竞聘上岗，经理层成员任期制和契约化管理 100% 全覆盖，1 家企业试行轮值总经理制度。着力实施改革专项工程，持续深化对标世界一流管理提升行动，任务完成率 89%；2 家“双百企业”、2 家“科改示范企业”有序推进综合改革，1 家企业获得国资委“科改示范企业”专项评估优秀评价。

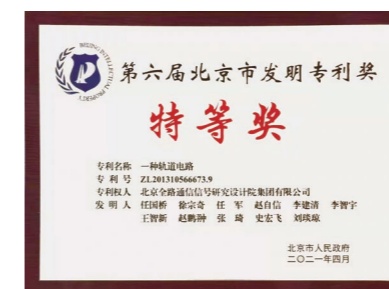
Following General Secretary Xi Jinping's important instructions on the SOE reform, CRSC has continued to implement the decision-making and deployment of the Party Central Committee and the State Council on three-year action plan (2020-2022) for SOE reform, strengthened organization and leadership, improved the working mechanism, strengthened supervision and assessment to solidly promote the implementation of various reform measures. CRSC has completed 147 reform measures of the 172 in the three-year action plan, with a completion rate of 85%. Important results have been achieved in key areas, and reform experience has been exchanged in the state-owned assets system as an advanced model. The Group has made great efforts to build a market-oriented operation mechanism, implement the "larger departments" (reform aimed at streamlining government department functions), build a "strategy + operation management and control" headquarters, which are to build a scientific and efficient internal organization system that could coordinatively operate and connect top to bottom. The headquarter took the lead in implementing all employees to compete for posts. 5 second-class enterprises introduced the competition mechanism at the manager level, and all the managers have signed the fixed-term employment contracts. 1 subsidiary company piloted the job rotation system among general managers. Focusing on special reform projects, CRSC has continued to benchmark the management system against the world-class level, task completion rate achieving 89%. The comprehensive reforms were orderly promoted in the two enterprises under "Double-Hundred Action" and two under "Science Reform Demonstration Action". One enterprise was recognized as "Excellent" in "Science Reform Demonstration Action" evaluation by SASAC.

科技创新持续取得重要突破

CRSC made consistent breakthroughs in S&T innovations

2021 年，基于运行计划和实时位置实现自主资源管理、可主动间隔防护的列车自主运行系统（启骥 TACS 系统）完成在深圳 20 号线的调试和多车追踪试验，并顺利开通，圆满实现国内首个 TACS 商用；基于全电子联锁的 CBTC 系统杭海城际现场试验，并在长春 3 号线延伸线实现了首个工程交付；铁路货物运输综合调度指挥管理系统在神华铁路包神线、神朔线的示范应用，提高了调度指挥效能；京沈无线闭塞中心（RBC）国产化 ISDN 服务器的自主化软件成功升级，摆脱对国外技术支持的依赖；1 项信息化建设成果案例成功入选中央企业“十三五”网络安全和信息化优秀案例名单；1 个项目获第三届中央企业熠星创新创业大赛二等奖；1 项发明专利荣获北京市发明专利奖颁奖大会唯一一个特等奖。公司持续开展知识产权创造、管理、保护、运用，建立了知识产权风险识别机制、预警机制、知识产权保护工作体系等相应的管理机制，共发布技术标准 258 项，新增授权专利 694 项、申请海外专利 118 项，获得省部级以上奖励 38 项。

In 2021, the train autonomous operation system (Qiji TACS system), which realizes independent resource management and active interval protection based on operation plan and real-time location, has completed the commissioning and multi vehicle tracking test in Shenzhen line 20, and opened successfully, realizing the first commercial TACS in China. The CBTC system based on full electronic interlocking has been tested in Hangzhou-Haining intercity field, and the first project delivery has been realized in the extension line of Changchun line 3. The demonstration application of railway freight transportation comprehensive dispatching command management system in Baotou-Shenmu railway and Shenmu-Shuozhou railway has improved the dispatching command efficiency. The independently developed software of the localized ISDN server in the RBC (Radio Block Center) for Beijing-Shenyang high-speed railway was successfully upgraded, which freed the Group from foreign technology dependency. 1 informatization case was successfully selected into the list of outstanding SOEs cases of cybersecurity and informatization in the "13th Five-Year Plan". 1 project won the second prize of the 3rd SOEs Shining Star Innovation Competition. 1 invention patent won the only Grand Prize of Beijing Municipal Invention Patent Awards Conference. We continued to carry out the creation, management, protection and application of intellectual property rights, established corresponding management mechanisms such as intellectual property risk identification mechanism, early warning mechanism and intellectual property protection system, issued 258 technical standards, added 694 authorized patents, applied for 118 overseas patents, and won 38 awards above the provincial and ministerial level.



安全质量保卫战 成效持续巩固

CRSC tasted riper fruits in safety and quality assurance

全系统坚决贯彻落实习近平总书记关于安全生产的重要讲话和指示批示精神，守住底线、红线，常态化开展了安全质量监督检查和年度考核，持续推进安全生产专项整治三年行动，坚持强基础、抓关键、重落实、除隐患、保稳定、促发展，全面落实安全质量重点工作，全年事故及设备故障率同比下降 5.24%，有力保障了全国 15 万公里铁路、超 4 万公里高铁安全稳定运行。荣获中国土木工程詹天佑奖 1 项、国家优质工程 6 项、省部级优质工程 21 项。

By resolutely implementing the spirit of General Secretary Xi Jinping's important speech and instructions on workplace safety, CRSC has continued to adhere to the bottom line and red line, conduct safety and quality supervision and annual assessments on a regular basis. The Group continued to promote the Three-year Dedicated Rectification Actions for Workplace Safety, basing on strong foundations, key points and practical act to eliminate hidden dangers, maintain stability, and promote development. CRSC fully implemented key tasks for workplace safety, decreased the annual accident and equipment failure rate by 5.24% year-on-year, effectively ensuring the safe and stable operation of 150,000 kilometers of railways and more than 40,000 kilometers of high-speed railways nationwide. CRSC won 1 Tien-yow Jeme Civil Engineering Prize, 6 national high-quality projects, and 21 provincial and ministerial-level high-quality projects.

选先树模工作 成果显著

CRSC enjoyed a bumper harvest in model setting

中国通号 2 家装备制造企业优秀团队代表分获“全国工人先锋号”和“全国五一巾帼标兵岗”荣誉称号，12 名员工获“全国技术能手”称号，1 名员工入选中国科协第六届“青年人才托举工程”名单，3 名优秀党员、1 名优秀党务工作者、3 个先进基层党组织获国资委党委表彰，1 名员工获 2020 年“最美铁路人”称号。2 家企业荣登《2021 年度软件和信息技术服务竞争力百强企业》榜单，2 家企业入选“第六批制造业单项冠军示范企业名单”，1 家企业成功入选国家第二批先进制造业和现代服务业融合发展试点名单。

The outstanding teams from two CRSC's equipment manufacturing enterprises were respectively awarded the honorary titles of "National Worker Pioneer" and "National May 1st Women's Model Post". 12 employees were awarded the title of "National Technician", and 1 employee was selected in the list of the 6th "Young Talent Support Project". 3 party members, 1 party affair worker, 3 grass-roots party organizations were commended by the SASAC Party Committee. 1 employee was awarded the title of "The Most Beautiful Railway Worker in 2020". 2 companies were included in the "Top 100 Competitive Enterprises in Software and Information Technology Services in 2021". 2 companies were included in the "Sixth Batch of Demonstration Enterprise in Manufacturing Industry". 1 company was successfully selected into the second batch of pilot companies for the integrated development of industry and modern service.

重点工程项目 稳步推进

CRSC steadily promoted the progress of key engineering projects

参建最美扶贫高铁—张吉怀高铁、最美天路—拉林铁路等国家重大项目，按期开通连徐、赣深、安九、鲁南、乌将等 16 项重点工程，交付运营高铁 1,500 公里、普铁 2,300 公里。中国通号不断完善产品技术服务体系，城市轨道交通行业领先优势持续保持。2021 年，开通城市轨道交通 29 条，625.19 公里，持续稳居业内第一。卡斯柯公司一次性开通 3 条 GoA4 级无人驾驶线路，开启列车自主运行系统发展新阶段。年底收官之际，城交公司上演 5 条城轨项目齐开通盛况。大力弘扬大国工匠精神，全面推进精品工程实施、创建，得到国铁集团、建设单位、业内专家的充分肯定和大力表彰，全年收到各路局、建设单位贺电表扬信 62 封。

CRSC have engaged into many major national construction projects, such as "the most beautiful high-speed railway for poverty-stricken area" (Zhangjiajie-Jishou-Huaihua high-speed railway), "the road to the heaven" (Lhasa-Nyingchi railway). 16 key projects such as Xuzhou-Lianyungang, Ganzhou-Shenzhen, Anqing-Jiujiang, Rizhao-Lankao, Urumqi-Jungar Basin, etc. were opened on schedule, and providing technologcial service for 1,500 kilometers new high-speed railways and 2,300 kilometers new conventional railways. CRSC has continuously improved its product technical service system and maintained its leading edge in the urban rail transit industry. In 2021, 29 urban rail lines supported by CRSC, with a distance of 625.19 kilometers, have been opened, ranking the first in the industry. 3 lines with the highest international grade of automation (GoA4) participated by CASCO Signal Ltd. opened, which opened a new stage of development of the autonomous train operation system. At the end of the year, CRSC Urban Transportation Company staged a grand opening event of five urban rail projects. With the mindset of craftsmanship to implement high-quality projects, the works of CRSC have been fully affirmed and commended by the China Railway, construction units, and industry experts. CRSC received 62 commendation letters from various railway companies and construction units throughout the year.



积极践行 “一带一路”倡议

CRSC actively implemented the "Belt and Road" initiative

高标准建设交付中老铁路，稳步推进匈赛铁路、雅万、泰国复线改造等重点项目；在匈牙利首都布达佩斯打造欧洲区第二座，欧盟首个 ETCS-2（欧洲列车运行控制系统）实验室，推动中国高铁技术和产品立足欧洲，走向全球；自主研发的 ETCS-400T 车载系统随双层动车组出口至德国，为车载产品国际化推广奠定基础。RBC（无线闭塞中心）、LEU（地面电子单元）产品获颁匈牙利 DeBo 质量证书，突破进入欧盟市场的技术壁垒，获得欧盟市场“通行证”。

Adhering to the high standard, CRSC supported the construction of the China-Laos Railway and steadily advanced key projects such as Hungary-Serbia Railway, Akarta-Bandung High-Speed Railway and the reconstruction of the Thai double-track railway. CRSC built the first ETCS-2 laboratory in Budapest, the capital of Hungary, which is the second laboratory of CRSC in Europe, to promote Chinese high-speed rail technology and products to be based in Europe and go global. The ETCS-400T on-board system independently developed by CRSC was exported to Germany along with the double-decker EMU, laying the foundation for the international promotion of on-board products. RBC (Radio Blocking Center) and LEU (Land Electronic Unit) were awarded the Hungarian DeBo Quality Certificate, breaking through the technical barriers to the EU market and obtaining the "passport" into EU.

企业品牌形象 持续提升

CRSC's brand image continued to improve

2021 年，中国通号以 117.78 亿元的品牌价值成功入选《2021 中国品牌 500 强》榜单，位列上榜央企 42 名，总排名第 201 位。同时，公司凭借良好的企业信誉和优质的工程质量，在诸多企业中脱颖而出，获得“全国建筑业 AAA 级信用企业”荣誉称号。11 月，中国通号连续四年参展中国国际进口博览会，签约采购质量屡创新高，持续扩大与国外优秀企业的合作领域与规模。QC 小组及质量信得过班组活动再创历史佳绩，获国优 QC 小组 2 个，全国质量信得过班组 3 个，94 个 QC 小组和 3 个质量信得过班组为省部级成果，中国通号品牌根基进一步夯实。

In 2021, CRSC was successfully selected into the list of "China 500 2021" with a brand value of 11.778 billion yuan, ranking 42nd among state-owned enterprises on the list and 201st overall. By virtue of its good business reputation and high-quality projects, CRSC stood out among many enterprises and won the honorary title of "National Construction Industry AAA Credit Enterprise". In November, CRSC participated in the China International Import Expo for four consecutive years, signing procurement contracts with a new high, expanding the field and scale of cooperation with outstanding foreign companies. The QC teams have achieved historical success again in the quality trustworthy activities, with 2 QC teams winning National Excellent Team, 3 winning national quality trustworthy teams, 94 QC teams and 3 quality trustworthy teams winning provincial and ministerial rewards, all of which further consolidated the foundation of CRSC's brand.

履行社会责任彰 显央企担当

CRSC fulfilled social responsibilities to demonstrate the responsibility of central SOEs

在 2021 年 2 月全国脱贫攻坚总结表彰大会上，1 人获评“全国脱贫攻坚先进个人”荣誉称号。河南省社旗县委、县政府向中国通号发来感谢信，对中国通号 18 年来给予全县脱贫攻坚事业的全方位支持和无私帮扶，助力社旗县高质量打赢脱贫攻坚战表示由衷感谢。7 月，河南多地因持续强降雨造成水灾，导致铁路、地铁站线设备不同程度损毁，列车停运，旅客滞留，中国通号党委迅速集结动员，开展抢险救援，并快速筹集 1,000 万元现金，用于支援河南省防汛救灾和灾后重建，为全面战胜水患灾害、恢复轨道线路畅通、保障地区经济社会正常运转、挽救国家公共财产安全贡献通号力量。

At the National Poverty Alleviation Summary and Commendation Conference in February 2021, one CRSC's employee was commended as the advanced individual in poverty alleviation. Sheqi County Party Committee and County Government of Henan Province sent a letter of thanks to CRSC, expressing sincere gratitude to CRSC for its all-round support and assistance to the county's poverty alleviation over the past 18 years, which helped Sheqi County to win the battle against poverty with high quality. In July, the severe rainfall in Henan province resulted in the damage to the equipment of railway and subway station, leading to train suspensions, and stranding passengers. The CRSC Party Committee made quickly response, carried out emergency rescue, and quickly raised 10 million yuan in cash to support disaster relief and post-disaster reconstruction in Henan Province, making a contribution to protect national public property.



关于我们 About Us

公司简介 Company Profile

中国通号是以轨道交通控制技术为特色的高科技产业服务商，是中国轨道交通控制系统行业的领导者、全球领先的轨道交通控制系统提供商。公司拥有集轨道交通控制系统设计研发、装备制造及工程安装于一体的完整产业链，是中国轨道交通控制系统设备制式、技术标准及产品标准的归口单位，是唯一获国家铁路局授权的铁路控制系统和通信信号产品的标准化技术审核单位。

China Railway Signal & Communication Co., Ltd. (hereinafter referred to as CRSC) is a hi-tech service provider featured by railway signal and communication technology, the leader in China rail transit control industry, and an internationally leading rail transit system provider. We provide specialized one-stop solution of design and integration, equipment manufacturing and engineering installation for rail transportation control systems to our clients, and serve as the responsible department of rail transit control system equipment modes, technology standards and product standards in the PRC, as well as the only authorized reviewer of rail control systems and communication signal product standards by National Railway Administration of the People's Republic of China.

2015年8月7日，公司成功登陆香港联合交易所。2019年7月22日，公司在上海证券交易所科创板上市，成为登陆科创板的首家大型央企和A+H股的科创板上市公司（股票代码：688009.SH，03969.HK）。

On August 7, 2015, CRSC was successfully listed on HKEX. On July 22, 2019, CRSC was listed on STAR Market of Shanghai Stock Exchange (SSE), and became the first state-owned enterprise and the first A+H company on SSE STAR Market (stock code: 688009.SH, 03969.HK).

发展战略 Development Strategy

中国通号以“坚守主责、创新引领、突出主业、多元协同”为战略导向，实施“六核一体两翼”业务战略，构建“轨道交通+N”产业格局，建设以轨道交通为特色、系统技术全球领先、综合实力世界一流的产业集团。

CRSC takes "adhering to main responsibilities, leading innovation, highlighting main business, and diversifying synergy" as the strategic orientation, implements the business strategy of "Six Cores, One Integration and Two Bases", creates a "rail transit + N" industrial pattern, and to build an industrial group with rail transit as its feature, global leading system technology and world-class comprehensive strength.



业务布局

Business Layout

中国通号以“六核一体两翼”赋能轨道交通产业，辐射壮大新兴产业，构建“轨道交通+N”产业协同发展格局。

CRSC empowers the rail transit industry with its business strategy ("Six Cores, One Integration and Two Bases"), expands emerging industries, and creates a coordinated development pattern of "rail transit + N".

六核 Six Cores

信号（控制）系统、信息通信、电力电气化、工程总承包、投资运营、智能制造等六大核心业务协同发展

CRSC develops the six core businesses of signal (control) system, information and communication, electric power electrification, general contracting, investment and operation and intelligent manufacturing in a coordinated manner

一体 One Integration

设计研发、装备制造、工程安装全产业链一体发展

CRSC promotes the integrated development of the whole industrial chain of design and development, equipment manufacturing, and engineering installation

两翼 Two Bases

加强国际经营，推动国内、海外两大市场均衡发展

CRSC strengthens international operations and promotes the balanced and coordinated development of domestic and overseas markets



中国高铁列控系统 (CTCS-3)

China's Train Control System for HSRs (CTCS-3)



中国高铁自动驾驶系统 (CTCS-3+ATO)

China's Automatic Train Operation System for HSRs (CTCS-3+ATO)



城市轨道交通列控系统 (CBTC)

Train Control System for Urban Transit (CBTC)



城际铁路自动驾驶系统 (CTCS-2+ATO)

Train Automatic Train Operation System for ICRs (CTCS-2+ATO)

八大核心技术体系 Eight Core Technologies



中低速磁悬浮控制系统 (MATC)

Train Control System for Medium and Low Speed Maglev (MATC)



货运编组站自动化系统 (CIPS)

Automation System for Freight Marshalling (CIPS)



铁路综合智能运行维护管理系统

Integrated Intelligent Railway Operation Maintenance Management System



综合运输调度指挥系统

Integrated Transportation Dispatching & Commanding System

企业文化

Corporate Culture

愿景和使命

Vision and Mission

发展国家列控技术民族产业，引领全球轨道交通技术进步，守护人们美好出行。

Develop the National Industry with Train Control Technology, Lead the Technological Progress of Global Rail Transit, Guard People's Beautiful Travel.

核心价值观

Core Values

以人为本 创新求进 安全至上 共创价值

人是公司发展最大的资本。
自主创新是公司发展的动力。
质量安全是公司发展的基石。
创造价值是公司的矢志追求。

People-Oriented, Innovation & Progress, Safety-First, Joint Value Creation

CRSC advocates people-first approach.
Independent innovation is the momentum for CRSC's development.
Quality and safety are the cornerstones for CRSC's development.
Value creation is the eternal pursuit of CRSC.

企业精神

Corporate Spirit

求实 创新 拼搏 奉献

作风严谨，尊重科学，遵章守纪，追求实绩。
开放合作，勇于攀登，精益求精，追求卓越。
泰而不骄，败而不馁，敢打硬仗，无私无畏。
恪尽职守，勇于担当，励精图治，产业报国。

Realism, Innovation, Endeavor and Dedication

Rigorous attitude and scientific spirit, Compliance with regulation, Pursuit of results.
Openness and cooperation, Courage and efforts, Strive for perfection, Aspire for excellence.
Poised but not arrogant, Failed but not discouraged, Selfless and fearless.
Devoted and responsible, Ambitious and serve the country.

公司治理

Corporate Governance

治理架构 Governance Framework

中国通号严格遵守《中华人民共和国公司法》《中华人民共和国证券法》《上市公司治理准则》等相关法律法规，构建了“三会一层”的现代公司治理架构，明确具体职责，制定科学有效的议事规则和工作程序，确保公司运行规范、运转协调。

According to the requirements of the "Company Law of the People's Republic of China" "Securities Law of the People's Republic of China" "Code of Corporate Governance for Listed Companies in China" and other laws and regulations, CRSC set up modern corporate governance architecture represented by Three Committees and Boards and One Layer, specified relevant responsibilities, and formulated scientific and efficient rules of procedure and working processes to ensure legitimate and coordinated corporate operations.

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Zhou Zhiliang
Secretary of CPC, Chairman,
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傅俊元
独立非执行董事
Fu Junyuan
Independent Non-Executive
Director

高管团队 Top Management Team



胡少峰
党委常委、总会计师、
董事会秘书
Hu Shaofeng
Party Committee Member,
Chief Accountant, Secretary
of the Board of Directors



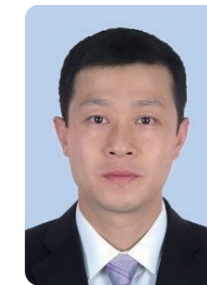
赵晓东
党委常委、副总裁
Zhao Xiaodong
Party Committee Member,
Vice President



黄卫中
党委常委、
副总裁
Huang Weizhong
Party Committee
Member, Vice
President



姚希春
党委常委、纪委书记
Yao Xichun
Party Committee
Member, Secretary
of Commission for
Discipline Inspection



张志辉
党委常委、副总裁、
总工程师
Zhang Zhihui
Party Committee
Member, Vice President,
Chief Engineer

监事会 Board of Supervisors



孔宁
监事会主席
Kong Ning
Chairman of the Board of
Supervisors



李铁南
股东代表监事
Li Tienan
Shareholder Supervisor



扬扬
职工代表监事
Yang Yang
Employee Representative
Supervisor

组织架构

Organizational Structure



合规运营

Compliant Operations

2021 年
开展法治合规培训

113 次

参加人数

12,048 人次

In 2021, CRSC carried out **113** legal compliance trainings throughout the year, with **12,048** participants at different levels of the group companies and subsidiaries

中国通号坚持“全面覆盖、全员参与、全业务融合、全面协同监督”的合规管理原则，建立“事前有标准、事中有监控、事后有评价、事件有追责、持续有改善”的合规风险管控机制。持续完善合规管理体系，目前公司内控管理制度横向上覆盖公司所有 21 项管理业务的 64 个业务板块，纵向上形成基于公司章程的基本管理制度、具体管理规范、工作指引等四层级制度体系。2021 年，制定并发布《关于防范应收账款法律风险的工作指引》《世界银行资助项目合规专项指引》《中国通号商业秘密保护合规指引》《中国通号境外经营合规管理指引》，细化重点领域合规专项风险防控措施。拟定合同标准文本库及条款库，大力推进法律工作标准化。组织开展公司年度合规性评价，编制公司合规性评价报告。优化兼职合规管理员制度，强化合规管理与业务的融合。组织开展集团公司及各子企业不同层面的法治合规培训，全年开展法治合规培训 113 次，参加人数 12,048 人次。

Upholding the compliance management principles of "Full Coverage, Full Participation, Full Business Integration and Comprehensive and Coordinated Supervision", CRSC established the compliant risk control mechanisms of "predesigned standards and sufficient and continuous supervision, assessment, accountability and enhancement". CRSC continued to improve the compliance management system. At present, in horizontal direction, the Company's internal control management system covers 64 segments of all 21 management sectors of the Company, and in vertical direction, a four-level system based on the company's articles of association has formed, which includes the basic management system, specific management norms, and work guidelines. In 2021, CRSC formulated and released the "Working Guidelines on Preventing Risks of Accounts Receivable", "Special Guidelines on Compliance of World Bank-funded Projects", "Guidelines on Compliance of CRSC Business Secret Protection" and "Guidelines on Compliance Management of CRSC's Overseas Operations" to refine the special risk prevention and control measures for compliance in key areas. The Group also formulated a library of templates of standard contract and clauses, vigorously promoting the standardization of legal work. With company's annual compliance evaluation result, we also prepared the Company's compliance report. We have also optimized the part-time employees administration system to strengthen the compliance management. CRSC carried out 113 legal compliance trainings throughout the year, with 12,048 participants at different levels of the group companies and subsidiaries.

风险防控

Risk Management

2021 年，中国通号加强全面风险防控管理体系建设，将风险防控工作与经营管理工作不断融合，进一步完善公司全面、全员、全过程的风险防控体系。持续开展重大风险动态跟踪监测，完善风险量化监测指标，风险监测指标从 49 项增加到 64 项，定期分析公司内外部环境因素变化及其可能产生的影响，编制季度重大风险季度监测报告。按季度跟踪重大风险事件，定期监测重大经营风险事件。持续构建“专案跟踪、专题研讨、专人处理、以案促管”的纠纷案件管理模式，探索开展“解剖麻雀”，实现以案促管。2021 年年底，召开集团公司全系统风险防控专题会，专题部署风险防控工作。通过完善集团公司各子企业董事会建设，发挥董事会“防风险”职能，进一步强化风险防控作用和效果。

In 2021, CRSC continued to strengthen a comprehensive risk prevention and control management system, continuously integrate risk prevention with operation and management, and further improve the comprehensive risk control system throughout the whole group and covering all staff. CRSC dynamically tracked and monitored major risks, improved risk monitoring system, monitoring indicators increasing from 49 to 64. The risk monitoring system analyzed changes in the Company's internal and external environmental factors and the possible impacts regularly. CRSC also compiled

major risk quarterly reports to track major risk events on a quarterly basis and monitor major business risk events regularly. CRSC built a dispute management model with "project tracking, special hearings, special personnel handling, and case-based management". We dived into the preliminary tests on small samples to achieve case-based management. At the end of 2021, a special meeting on risk management throughout whole system of the Group held to deploy risk prevention and control task on the topic. By improving the construction of the board of directors of various subsidiaries, the Group let the board of directors play the "risk prevention" function to further strengthen risk management.



党建工作

Party Building

中国通号深入学思践悟习近平总书记重要讲话精神，坚持把党的政治建设摆在首位，把抓党建、强党建作为最大的政治责任，推动党建工作与中心工作同频共振、同向发力，以高质量党建领航高质量发展。2021 年，中国通号党委聚焦坚定使命职责、强化担当作为，教育引导全系统党员学党史、悟思想、办实事、开新局，在做强做优做大中国通号中树立新风貌、彰显新担当、展示新作为。

CRSC has thoroughly studied and realized the spirit of General Secretary Xi Jinping's important speech, insisted on putting the party's political construction in the first place, taking party building and strengthening party building as the greatest political responsibility. All the efforts promoted the party building work and the central work to interact at the same frequency and in the same direction, leading high-quality development with high-quality party building. In 2021, the CRSC Party Committee continued to focus on its mission and responsibilities, educate and guide the party members of the whole system to learn the party history. By better understanding spirit of party, all the party members opened up new situations with practical act, so as to establish a new look and feel in making CRSC stronger, better and bigger and demonstrate new responsibilities and new actions.



坚定信念， 强化理论学习

Strengthening theoretical study to consolidate commitment

中国通号成立党史学习教育领导小组，制定党史学习教育方案和推进计划，召开党史学习教育动员部署大会，印发党史学习教育口袋书、大事记 7,000 余册，推进党史学习教育扎实开展。坚持“四学联动”，集团公司党委落实“第一议题”12 次，开展理论学习中心组集体学习 17 次，深入学习习近平总书记重要讲话和指示批示精神 47 篇。

CRSC established a Party history study group, formulated a study plan and promotion plan, held a deployment conference, printed and distributed more than 7,000 booklets and memorabilia on the Party's history. Adhering to the "Learning in Four Ways", the Party committee of the Group implemented the "First Issue" campaigns for 12 times, carried out 17 collective studies to thoroughly study 47 important speeches delivered by General Secretary Xi Jinping.



以学促干， 深化党建融合

Promoting practices by learning and the integration of party building

中国通号聚焦职工群众“急难愁盼”问题，深入开展“我为群众办实事”实践活动。将党史学习教育与做好当前工作紧密结合起来，与推动落实国企改革三年行动紧密结合起来，引导广大党员立足岗位学党史、强使命、促担当，把党史学习成果转为开展工作、推动改革的强大动力，切实解决职工群众的实际困难。举办中国通号首届党建品牌创建推进会，在全系统首批征集 50 个特色党建案例，发布 5 个特色党建品牌，甄选 29 个案例进行集锦汇编，用典型标杆激励基层党组织创先争优，不断提升党建与企业中心工作的有机融合。

CRSC carried out the "I Do Practical Things for the Masses" activities, solving numerous "urgent, difficult and worrying" problems. The Group closely combined the Party history with the current work, and with the three-year action to promote the implementation of the reform of SOEs, which guided the majority of party members to learn party history, strengthen mission, and promote responsibility based on their posts, and turn the results of party history learning into work. All these efforts effectively solved the practical difficulties of the workers and the masses. CRSC held the first party building brand promotion meeting, collected 50 characteristic party building cases in the first batch of the whole system, released 5 characteristic party building brands, and selected 29 cases for compilation, used typical benchmarks to motivate grassroots party organizations, and continuously improved the organic integration between party building and work.

所属企业党组织严格落实“第一议题”制度、组织集中学习研讨，全系统 396 个党支部通过会议传达、党课宣讲、专题学习、知识竞赛、交流讨论、个人自学等方式，充分利用学习强国、官方微信、官网党史学习教育专栏等载体，实现党史学习教育全覆盖。迅速组织动员，广泛开展党的十九届六中全会精神学习宣贯活动。组织党员到西柏坡开展红色教育，举办党史学习教育读书班，全系统 4,000 多人参加学习，引导党员干部进一步增强党性观念、强化初心使命。

The Party organization of the affiliated enterprise strictly also implemented the "First Issue" system and organized collective study campaigns. The 396 Party branches of the whole system made full use of network resources, such as Xuexi Qiangguo (app), WeChat, websites to achieve full coverage for party history learning and education. Besides, the Group extensively carried out activities to study the spirit of the Sixth Plenary Session of the 19th Central Committee of the Communist Party of China. Party members went to Xibaipo for red education. More than 4,000 people from the whole system participated in Party history learning and reading classes, which guided party members and cadres to further enhance the concept of party spirit and strengthen their original mission.

形式多样， 开展党史学习教育

Carrying out party history learning and education in various forms

中国通号组织“开展七个一、我为党献礼”活动，组织党员寻足迹、祭英烈，听革命事迹、唱红色歌曲。组织全系统 7,000 余名党员视频收看庆祝大会盛况，以“以史为鉴、开创未来”为主题召开学习座谈会，举办庆祝建党 100 周年暨“光荣在党 50 年”纪念章颁发大会，组织党员到中国共产党历史展览馆参观学习，广泛开展重温入党誓词活动。企业百年信物煤油号志灯登上央视舞台，在广大党员干部职工中引起热烈反响。组织广大党员积极参加专题网络培训班，以每日打卡形式通过“学习强国”收看中央宣讲团宣讲报告，优秀党员代表、新发展党员、入党积极分子撰写学习心得共计 2,000 余篇。

CRSC organized the "Seven Ones" campaign to tribute to the Party, tracing footprints, paying tribute to martyrs, listening to revolutionary deeds. Over 7,000 party members in the whole system watched the grand celebration of the conference. The study symposium and commemorative medal awarding conference with the theme of "Taking history as a mirror and creating the future" was held to celebrate the 100th anniversary of the founding of the party. CRSC also organized party members to the exhibition hall to review the history and oath of the Communist Party of China. The kerosene lantern, a century-old token of the enterprise, appeared on the CCTV stage, arousing enthusiastic responses among the majority of party members and workers. The special online training courses were organized for the majority of party members to watch the lecture reports through Xuexi Qiangguo APP. Representatives of outstanding party members, newly developed party members, and party activists have totally written more than 2,000 pieces of learning reports.

反腐倡廉

Anti-corruption and Integrity Advocation

2021 年

人均反腐败培训

7.2 小时

In 2021, each employee averagely received 7.2 hours of anti-corruption trainings

中国通号深入开展党风廉政建设和反腐败工作，通过建立健全反腐败制度，完善工作流程和机制，进一步推动从管理人员到一线员工的全方位、立体化反腐败管理体系建设，严防腐败问题。2021 年，公司未发生腐败相关诉讼事件，未发生舞弊诉讼案件，人均反腐败培训 7.2 小时。

CRSC has carried out in-depth construction of party conduct and anti-corruption work. By establishing and improving anti-corruption systems, improving work processes and mechanisms, it has further promoted the construction of an all-round and three-dimensional anti-corruption management system from managers to front-line employees, strictly preventing corruption. In 2021, no corruption-related and fraud-related lawsuits occurred in CRSC, and each employee averagely received 7.2 hours of anti-corruption trainings.

01 增强制度建设

Strengthening system construction



修订《运用监督执纪“四种形态”实施办法》《所属企业纪委向集团公司纪委报告工作办法》等多项制度，进一步扎紧反腐败制度“笼子”。

制定《关于严肃改革纪律 加强改革风气监督的意见》《深化整治“靠企吃企”问题九条禁令》，严防改革发展中的腐败问题。

CRSC revised a number of systems such as the "Implementation Measures for the "Four Methods" of Supervision and Discipline Implementation" and the "Measures for Disciplinary Reports from Subsidiary Enterprises to the Group" to further tighten the regulation of the anti-corruption system.

We formulated the "Opinions on Severely Reforming Discipline and Strengthening the Supervision of Reform Culture" and "Nine Prohibitions on Deepening the Rectification" to strictly prevent corruption during the reform and development.

02 提高监督执纪质量

Improving the quality of supervision and discipline



充分运用、持续完善《监督执纪工作手册》，及时开展案件质量和执纪安全监督检查，规范线索处置、审查审理等各项工作流程。

CSRC continued to improve and make full use of the "Supervision and Discipline Enforcement Work Manual", carried out timely safety supervision and audit on process quality and discipline enforcement to standardize various work processes such as clue disposal, review and trial.

03 完善信访举报程序

Improving complaint disposal procedures



修订《纪检信访举报工作管理办法》，进一步完善信访举报的接收、分流、研判处置，交办件的检查督办，实名举报的处理，信访举报情况的综合运用、诬告陷害行为的查处等工作程序和机制。

CSRC revised the "Administrative Measures for Disciplinary Inspection and Complaint Reporting" to further improve the working procedures and mechanisms for the reception, diversion, investigation and judgment and handling of petition reports, as well as the processing of real-name reporting and false accusation.



可持续发展管理 Sustainability Management

可持续发展理念 Sustainability Concept

坚持依法经营 诚实守信

Running business with integrity and abiding by law

模范遵守法律法规和社会公德、商业道德以及行业规则，及时足额纳税，维护投资者和债权人权益，忠实履行合同，恪守商业信用，反对不正当竞争，杜绝商业活动中的腐败行为。

CRSC is committed to the legal operation and highest standards of integrity, business ethics and industry regulation when working with all stakeholders, including investors and creditors. CRSC embraces the value of paying taxes in full amount, committing to the execution of contract, and keeping commercial credit. We are against unfair competition and business corruption.

不断提高盈利能力 Improving profitability

完善公司治理，提高管理水平。推进实施集团发展战略，突出做强主业，突出科技创新。合理配置资源，降低经营成本，加强风险防范，提高投入产出水平，增强市场竞争能力。

CSCR is committed to improving corporate governance and improving management level. CRSC is dedicated to the implementation of the Company's development strategy, focusing on strengthening the main business and scientific and technological innovation. CRSC has always been devoted to the rational allocation of resources to reduce operating cost with the precaution of risk prevention. Consequently, CRSC's production has gradually been more cost-effective, and its market competitive edge has been sharpened.

切实提高产品质量 和服务水平

Committing to product quality and service level

建立和贯彻并严格运行质量、环境、职业健康安全管理体系，从产品设计、生产制造、施工安装、用户服务等各个环节，强化全员质量意识，坚持持续不断改进，改善产品性能，提高产品可靠性、安全性，最大限度地满足铁路、轨道交通运输安全的需要。

CRSC is committed to the implementation of the management system which integrates quality, environment and vocational safety. CRSC values the quality awareness in every aspect of its business from product design, manufacturing, construction, installation to customer service. We constantly strengthen the quality awareness of all staff, adhere to continuous improvement, and strives to enhance the performance, reliability and security of products to meet the requirement of railway and mass transportation to the largest extent.

加强资源节约 和环境保护

Enhancing resources utilization and reducing our environmental impact

认真落实节能减排责任，带头完成节能减排任务。发展循环经济，提高各类资源综合利用效率。增加环保投入，改进工艺流程，降低污染物排放，改进施工工法，减少占地，保护植被，实施清洁生产。坚持走低投入、低消耗、低排放和高效的发展道路。

CRSC seriously implements the responsibility of energy conservation and emission reduction, takes the lead in completing the related task and develops a circular economy and improve the efficiency of comprehensive utilization of various resources. CRSC will increase environmental protection investment, improve process flow, reduce pollutant discharge, improve construction methods, reduce land occupation, protect vegetation, and implement clean production, adhering to the development path of low input, low consumption, low emissions and high efficiency.

推进自主创新 和技术进步

Promoting independent innovation and technology progress

实施创新驱动发展战略, 坚持科技自立自强, 建立完善技术创新机制, 加大科技投入, 提升原始创新、集成创新和引进消化吸收再创新能力。以建立中国高速铁路列车控制系统和配套产品体系为重点, 加快科技创新基地与基础设备研发平台建设。加快既有产品更新换代, 加快技术装备改造。加强知识产权保护, 健全知识产权保护体系, 加快形成一批具有自主知识产权、较完整配套的核心系统技术和产品体系, 发挥对行业产业的带动作用和对中国通号可持续发展的支撑作用。

CRSC is committed to implementing the innovation-driven development strategy, adhering to the self-reliance of science and technology, establishing and optimizing its technological innovation mechanism by sharpening its capacity to be more originally innovative, integrated creative and re-innovative after introduction, digestion and absorption of other technologies. CRSC is focused on the system building of Chinese high-speed railway train control system and auxiliary products by speeding up the construction of technological innovation bases and basic equipment research and development platforms. We are making efforts to speed up the product upgrading and technical equipment modification. CRSC is devoted to protecting intellectual property rights, improving the protection of intellectual property rights system and accelerating the formation of a core technology and product system equipped with proprietary intellectual property rights and relatively complete kit, thus playing as a role model in the industry development and CRSC's sustainability.

保障生产安全

Guaranteeing safe production

坚持强基础、抓关键、重落实、除隐患、保稳定、促发展。严格落实安全生产责任制, 加大安全生产投入, 严防重、特大安全事故发生。建立健全应急管理体系, 不断提高应急管理水平和应对突发事件能力。为员工提供安全、健康、卫生的工作条件和生活环境, 加大劳动保护监督检查力度, 保障职工职业健康, 预防和减少职业病和其他疾病对职工的危害。

CRSC is adhering to strengthen the strong foundation, grasping the key points, focusing on implementation, eliminating hidden dangers, maintaining stability. CRSC strictly sticks to the system of responsibility in workplace safety, increases input to ensure safety and prevents big or extraordinarily serious safety-related accidents. CRSC is also dedicated to building an emergency management system to increase its capability to face sudden events. CRSC is committed to providing a safe and healthy working environment. We equip employees with products and equipment that are safe for use. We also focus on implementing and improving processes and controls for preventing work-related accidents, injuries and illnesses.

维护职工合法权益

Focusing on employee's legal rights

依法与职工签订并履行劳动合同, 建立企业职工收入与企业效益相适应的工资正常调整和保障机制, 按时足额缴纳社会保险。尊重职工, 爱护职工, 公平对待职工, 杜绝性别、民族、宗教、年龄等各种歧视。加强职业教育培训, 创造平等发展机会。为社会创造就业机会。加强职代会制度建设, 深化厂务公开, 推进民主管理。关心职工生活, 切实为职工排忧解难。

CRSC signs labor contracts with employees according to the law. We ensure and reasonably adjust the salaries according to the corporate profitability and pay social insurance in full amount. CRSC respects and cares for employees and treats everyone fairly without discrimination against their gender, nationality, religion, and age. We embrace the value of vocational training and providing equal opportunities for them. CRSC strives to create more job opportunities for society. We pay attention to the formation of employee representative congress mechanism, deepen the openness of factory affairs and promote democratic management. We care about every employee's mentality and try to solve their problems together with them.

参与社会公益事业

Participating in public welfare undertakings

积极承担和热心参与扶贫、助困、捐助、志愿者等社会公益事业, 关心支持教育、文化、卫生等公共福利事业。在发生重大自然灾害和突发事件的情况下, 自觉听从当地政府和铁路等业务主管部门指挥, 积极提供人力、财力和物力等方面的支持和援助。

CRSC is actively taking part in public welfare undertakings such as poverty alleviation, donations and volunteering, and public welfare services in the areas of education, culture and sanitation. During natural disasters and sudden events, CRSC is a firm supporter of local government and railway authorities by proactively providing manpower, financial and material resources.

董事会参与 Participation of Board of Directors

2021 年
公司召开治理会议
16 次
In 2021, the Company convened
16 governance conferences

中国通号董事会对 ESG 工作负责，对 ESG 重大议题进行审议和决策，推进 ESG 理念与公司发展战略和经营管理融合。同时，董事会负责评估及厘定 ESG 风险的相关事宜，持续监督管理层对 ESG 风险管理及内部监控系统的设计、实施及监察工作。

2021 年，董事会基于对上一报告期间 ESG 工作的总结，对本报告期的 ESG 相关工作进行建议和规划，包括畅通利益相关方沟通渠道，加强董事会对 ESG 事宜的管理职责，通过加深公司 ESG 内控和风控董事会参与深度，确保本公司设立及时、有效的 ESG 风险管理及内部监控系统。2021 年，公司共召开治理会议 16 次，其中股东大会 2 次，董事会 10 次，监事会 4 次。

The Board of Directors of CRSC is responsible for ESG work, reviews and makes decisions on major ESG issues, and promotes the integration of ESG concepts with the Company's development strategy and operation management. At the same time, the Board of Directors is responsible for the assessment and determination of ESG risks, and continuously supervises the management's design, implement and monitor ESG risk management and internal control systems.

In 2021, based on the summary of ESG work in the previous reporting period, the Board of Directors made recommendations and plans for ESG-related work in this reporting period. ESG-related work includes smoothing the communication channels for stakeholders, strengthening the management responsibility of the BOD on ESG matters. By deepening the Company's ESG internal control and risk management and participation of the Board of Directors, it aims to ensure that the Company establishes timely and effective ESG risk management and internal monitoring systems. In 2021, CRSC convened 16 governance conferences, including 2 general meetings of shareholders, 10 board meetings and 4 supervisory board meetings.



可持续发展治理 Sustainability Governance

中国通号建立起全系统的社会责任体系，将社会责任理念渗透到公司日常经营等全方位管理之中，保证社会责任工作的具体落地。

CRSC has established a system-wide social responsibility system, infiltrating the concept of social responsibility into the Company's daily operations and other all-round management to ensure the concrete implementation of social responsibility work.

ESG 工作部门及主要职能

ESG departments and main functions

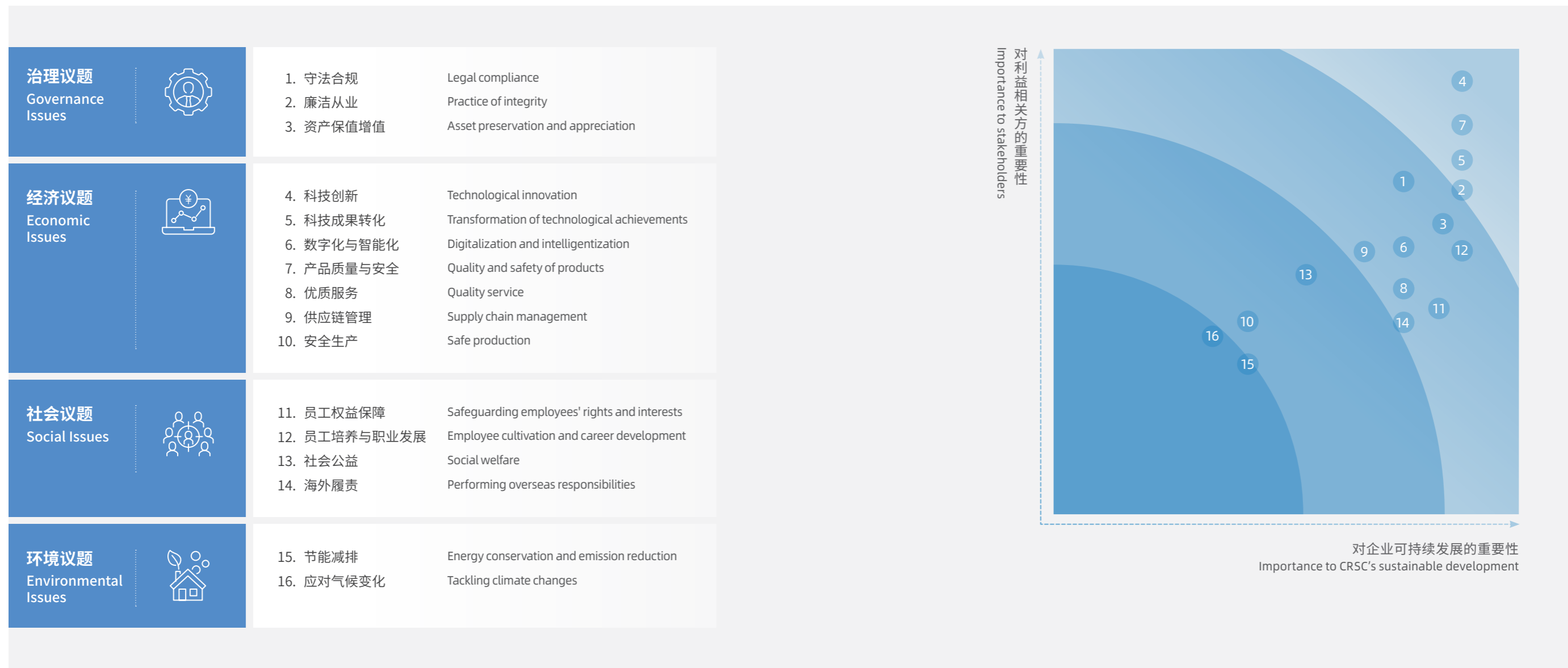
部门 Department	职责 Duty
综合管理部 General Management Department	发展规划、企业改革、公司治理、投资管理、机关运转、综合服务 Development planning, enterprise reform, corporate governance, investment management, office operation, comprehensive services
人力资源部 Human Resources Department	员工关爱、员工责任、职业培训、权益保护、平等雇佣 Employee care, employee responsibility, vocational training, rights protection, employment equality
财务部 Finance Department	依法纳税、财务信息披露 Tax payment according to law, financial information disclosure
科技创新部 Technology Innovation Department	科技创新、工业生产、质量管控 Technology innovation, industrial production, quality control
安全监督管理部 (应急办、环境监督管理部) Safety Supervision and Management Department (Emergency office, Environment Supervision and Management Department)	安全生产、职业健康、环境管理、节能减排、应急管理 Safety production, occupational health, environmental management, energy conservation and emission reduction, emergency management
风控中心 Risk Control Center	法律管理、合规管理、风险管理、内控管理、内部审计、违规追责 Legal management, compliance management, risk management, internal control management, internal audit, accountability for violations
运营事业部 Operation Department	经营业绩考核、工程施工管理 Business performance appraisal, engineering construction management
物资装备部 Material and Equipment Department	供应商管理 Supplier management
党群工作部 Party Work Department	报告编制发布、党务党建、乡村振兴、困难帮扶、志愿活动、职工权益维护 Report compilation and release, party affairs and party building, rural revitalization, assistance to people in need, volunteer activities, protection of rights and interests of employees
纪检工作部 Discipline Inspection Department	反腐倡廉 Anti corruption
信息中心 Information Center	信息安全与保护 Information security and protection

实质性议题识别

Identification of Material Issues

中国通号梳理宏观政策导向，研究分析 ESG 报告标准要求，结合公司发展战略、利益相关方关注议题，根据与利益相关方之间的依赖程度、权责关系、影响程度等原则，比较、分析不同 ESG 议题对利益相关方的影响及对公司发展的重要性，开展实质性议题分析调研，就 16 个实质性议题进行评估、优次排序，相关分析结果呈报董事会讨论，并将相关反馈纳入可持续发展战略规划，分解到各部门执行。

CRSC studied the orientations of macro policies, explored and analyzed the standards and requirements of ESG reports. In combination with its development strategies and issues that arouse the attention of stakeholders, based on the dependency on, the relationships between rights and responsibilities for and the influence on stakeholders and other principles, CRSC comparatively dissected the influence and the importance of different ESG issues on/to its development, conducted surveys on material issues, and assessed and prioritized 16 material issues. The issues concerned and analytical results are shown below. These results were submitted to the Board of Directors for discussion and relevant feedbacks were incorporated into strategic plans for sustainable development, and then decomposed to various departments for implementation.



利益相关方沟通

Stakeholder Communication

中国通号重视与利益相关方的沟通，建立并完善沟通渠道及方式，积极回应利益相关方的期望与诉求，并及时向各方传递公司动态，提高企业运行透明度。

CRSC emphasized on the communication with stakeholders, established and enhanced communication channels and means, positively responded to the expectations and appeals of stakeholders, and conveyed our dynamics to all stakeholders in a timely manner, thus improving its operational transparency.

利益相关方类型 Stakeholders	政府机构 Government	股东与投资者 Shareholders and Investors	客户 Clients	员工 Employees	供应商 Suppliers	合作伙伴 Cooperation Partners	行业 Industry	环境 Environment	社区与公众 Community
期望与诉求 Expectations and Appeals	<ul style="list-style-type: none"> 贯彻宏观政策 诚信守法经营 依法纳税 促进就业 带动地方经济发展 	<ul style="list-style-type: none"> 良好的经营业绩 资产保值增值 信息合规披露 降低经营风险 股东权益保护 	<ul style="list-style-type: none"> 合同履行 产品质量安全 提供优质服务 保障客户隐私 	<ul style="list-style-type: none"> 保障员工权益 保障职业发展 员工生活关怀 保障薪酬福利 加强海外员工管理 	<ul style="list-style-type: none"> 诚信守法 阳光采购 扶持供应商成长 信息保密 	<ul style="list-style-type: none"> 诚信守法 遵守商业道德 合作共赢 	<ul style="list-style-type: none"> 公平竞争 科技创新研发 助力行业进步 	<ul style="list-style-type: none"> 遵守环境法律法规 践行节能减排 资源节约利用 环保意识提升 	<ul style="list-style-type: none"> 参与社区建设 社会公益服务
沟通方式 Communication Channels	<ul style="list-style-type: none"> 工作汇报 参加会议 监督检查 信息报送 	<ul style="list-style-type: none"> 企业定期报告及公告 业绩发布会 股东大会 投资者见面会 沟通汇报 	<ul style="list-style-type: none"> 客户拜访 客户满意度调查 电话、邮件、信件及在线反馈 	<ul style="list-style-type: none"> 职工代表大会 员工培训宣教 日常沟通 	<ul style="list-style-type: none"> 公开招标 开展合作 行业沟通与交流 	<ul style="list-style-type: none"> 高层互访 定期沟通交流 协议合同执行 	<ul style="list-style-type: none"> 加强同业交流 参加行业论坛 考察互访 	<ul style="list-style-type: none"> 环保技术应用 环保理念宣贯 环境信息公开 	<ul style="list-style-type: none"> 社区沟通宣传 开展公益活动

创新驱动 蓄积发展动能

Accumulating Development Momentum with Innovation-Driven Concept

中国通号始终坚持创新求进的核心价值观，瞄准高水平科技自立自强，完善“十四五”科技创新发展规划，加强关键核心技术攻关，开展前瞻性技术研究，加大创新平台建设，加快专利积累，推动科技创新成果转化，以科技创新支撑交通强国建设，助推行业多领域创新发展。

CRSC has always adhered to the core values of innovation and progress, aiming at high-level improvement via independently developed technology and the "14th Five-Year" innovation plan. Besides, CRSC has strengthened core technology research, carrying out forward-looking research, so as to increase innovation platform construction, accumulate patents, promote the transformation of innovation achievements, support the construction of strong transportation country, boost the innovation and development of the industry in multiple fields in many fields.

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Promoting Innovation Strategy
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Enhancing Innovation Capabilities
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Implementing Transformation of Achievement
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Empowering Industrial Progress

完善创新战略

Promoting Innovation Strategy



中国通号坚持“一个体系、二个中心、三个高地、四个平台、五大突破”的科技创新总体战略目标，强化科技创造力、技术引领力、创新发展力，加快建设科技领军企业。2021年，公司结合国家、行业等相关规划，编制“十四五”科技规划初稿，召开“十四五”科技规划座谈会，初步形成2022年科研立项指南意向和目录清单，并组织督导主要企业编制完成“十四五”科技子规划。

CRSC adhered to the overall strategic goal for technological innovation of "One System, Two Centers, Three Highlands, Four Platforms, Five Breakthroughs", strengthened the concepts of being creative, technology-leading, innovative development, so as to accelerate the construction of a leading technological enterprise. In 2021, CSRC has drafted the "14th Five-Year Plan" scientific and technological planning in combination with relevant national policies and industry plans. The "14th Five-Year" scientific and technological planning symposium was held, and the 2022 scientific research project guideline and catalogue list were initially formed. CSRC also organized and supervised the subsidiaries to form their plans of "14th Five-Year Plan" for Science and Technology.

中国通号科技创新总体战略目标

CRSC's overall strategic goal for technological innovation

构建一个体系 Constructing One System

01

- 构建以核心技术为方向、科技创新平台为依托、创新人才为基础，企业内上下游协同、国内政产学研用结合、研发资源全球配置的新时代使命引领型科技创新体系

Constructing a scientific and technological innovation system driven by the missions in the new era, oriented by core technologies, relying on technological innovation platforms, grounding on innovative talents, which achieves upstream and downstream collaboration within CRSC, the combination of government-industry-university-research-application in the domestic market and the global allocation of research and development resources

打造二个中心 Building Two Centers

02

- 具有全球竞争力的轨道交通控制技术创新中心
A rail transport control technology innovation center with global competitiveness
- 具有全球影响力的通信信号产业创新中心
A communication signal industry innovation center with global influence

引领三个高地 Leading Three Highlands

03

- 全球的轨道交通控制技术研发、制造、施工一体化服务的技术和模式输出高地
Technical and service mode output highland that integrates the research, development, manufacturing and construction of global rail transport control technologies
- 轨道交通通信信号高端人才创新集聚高地
Innovation clustering highland that attracts high-end rail transport and communication talents
- 全球的轨道交通知识产权和标准创造、运用、服务和转移高地
The highland of creating, applying, serving and transferring global rail transport-related intellectual property rights and standards

建设四个平台 Shaping Four Platforms

04

- 国家重点实验室、国家工程研究中心、国家产业创新中心为代表的国家级技术创新和科研成果转化平台
National transformation platforms of technological innovations and scientific achievements represented by Key State Laboratory, National Engineering Research Center and National Industrial Innovation Center
- 符合国际标准的具有第三方独立检测认证评估能力的检验检测试验平台
Inspection and testing platforms with third-party independent testing and certification assessment capabilities in line with international standards
- 面向全球的专注于轨道交通通信信号新技术孵化和创投培育平台
New technology incubation and venture development platforms with a global perspective for the rail transport and communication signal industry
- 面向全球的学术交流、人才培养平台
Academic exchange and talent cultivation platforms with a global perspective

实现五大突破 Achieving Five Breakthroughs

05

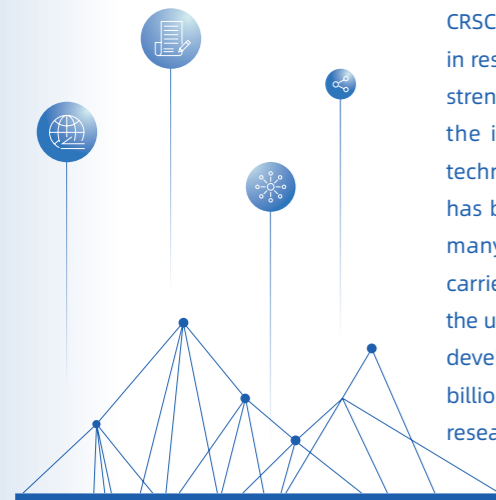
- 新一轮的全面科技管理改革取得重大突破
Major breakthrough in a new round of comprehensive scientific and technological management reforms
- 新一代关键核心技术和深度自主化取得历史性突破
Historic breakthrough in a new round of core technologies and in-depth autonomy
- 轨道交通安全控制技术在其他行业示范性应用的战略性突破
Strategic breakthrough in the exemplary application of rail transport safety control technologies in other industries
- 中国高铁标准与产业输出取得产品市场全球化、技术品牌国际化的突破
International breakthrough in China's high-speed railway standards and industrial outputs in occupying global market
- 科技创新动能不断激发，核心人才培养和引进取得重要突破
Critical breakthrough in constantly inspiring scientific and technological innovations, cultivating and attracting core talents

增强创新能力

Enhancing Innovation Capabilities

中国通号持续完善创新管理体系，加大研发投入力度，推动科技创新平台建设，加强科技人才队伍建设，完善知识产权管理和保护体系，提升技术创新能力、核心竞争力和品牌影响力，攻克高铁车体轻、速度快、线路高架多带来的适应性难题，多项技术达到全球领先水平；全面开展列控装备关键核心技术攻关，实现底层软硬件技术完全自主可控，领先行业发展。2021 年，中国通号科技投入 20.87 亿元，开展科研项目 772 项。

CRSC constantly enhanced innovation management system, increased investment in research and development, promoted the construction of innovation platforms, strengthened the construction of scientific and technological talentst, improved the intellectual property management and protection system, enhanced technological innovation capabilities as well as brand influence. The Company has broken through many new technologies for lighter body, higher speed with many technologies reaching the world's leading level. CRSC comprehensively carried out research on key technologies of train control equipment, realizing that the underlying software and hardware technologies are completely independently developed to lead the development of the industry. In 2021, CRSC invested 2.087 billion yuan in scientific and technological research, and carried out 772 scientific research projects.



中国通号 2019-2021 年科技投入及承担科研项目情况

CRSC's Research Inputs and Scientific Research Projects in 2019-2021



科技创新平台

Technological Innovation Platform

中国通号重视打造高层次科技创新平台，积极推动科技创新平台和示范建设工作，形成“3479+N”的科技创新平台和示范格局，建有院士工作站、博士后科研工作站、产学研平台等，为培养创新型人才构建了丰富、多元、先进的创新平台。2021 年，公司新增 5 个省部级创新平台，2 个国家重点实验室通过初选和专家答辩。截至 2021 年底，公司共拥有 3 个博士后科研流动工作站、4 个院士工作站、7 个国家和行业创新平台、9 个国家级创新示范、30 多个省部级重点实验室 / 工程技术研究中心 / 工程实验室。

CRSC attaches great importance to building a high-level scientific and technological innovation platform, actively promotes the construction of technological innovation platforms and demonstrations, and forms a "3479+N" technological innovation platform and demonstration pattern. The Company has established academician workstations, post-doctoral scientific research workstations, industry-university-research platforms, etc. A diverse and advanced innovation platform has been built for cultivating innovative talents. In 2021, the Company has newly built 5 provincial and ministerial innovation platforms. 2 national key laboratories have passed the primary selection and expert review. As of the end of 2021, the company has 3 post-doctoral research mobile workstations, 4 academician workstations, 7 national or industry innovation platforms, 9 national innovation demonstration titles, and over 30 provincial and ministerial key laboratories/engineering technology research centers/engineering experiments room.

2021 年新增示范（标杆）企业 New demonstration enterprises in 2021

西安工业集团、卡斯柯公司获得国家工信部“制造业单项冠军示范企业”认定
(Xi'an) Industry Group and CASCO were recognized as "Demonstration Enterprise in Manufacturing Industry" by the Ministry of Industry and Information Technology of the People's Republic of China

研究设计院集团、城交公司获得“2021 年度北京市知识产权示范企业”
Research & Design Institute Group and Urban Rail Transit Company won the "2021 Beijing Intellectual Property Demonstration Enterprise"

北信公司获得“北京市智能制造标杆企业”称号
(Beijing) Rail Industry Company won the title of "Beijing Intelligent Manufacturing Benchmark Enterprise"

2021 年新增省部级创新平台 New provincial and ministerial innovation platforms built in 2021

北京市先进轨道交通工业互联网工程研究中心（研究设计院集团）
Beijing Advanced Rail Transit Industrial Internet Engineering Research Center (Research & Design Institute Group)

河南省高可信智慧城轨工程研究中心（卡斯柯公司）
Henan Highly Dependable Smart Urban Rail Engineering Research Center (CASCO)

上海高速铁路列控装备工程技术研究中心（西安工业集团）
Shanghai High-speed Railway Train Control Equipment Engineering Technology Research Center ((Xi'an) Industry Group)

中关村国家自主创新示范区高精尖产业协同创新平台——先进轨道交通协同创新平台（研究设计院集团）
Zhongguancun National Independent Innovation Demonstration Zone High-precision Industry Collaborative Innovation Platform - Advanced Rail Transit Collaborative Innovation Platform (Research & Design Institute Group)

北京市认定企业技术中心（城交公司）
Beijing Technology Certification Center (Urban Rail Transit Company)

科研人才队伍 Scientific Research Talents

中国通号坚持强化科研人才培养，健全优化员工激励奖励机制，积极推动企业科技创新人才队伍建设，加强科技人才队伍选、用、育、留，激发企业创新活力。截至 2021 年底，公司共有研发人员 4,374 人。2021 年，中国通号新增 10 名茅以升铁道工程师奖获得者，新增 1 人获詹天佑成就奖，1 人获詹天佑青年奖，2 人获评交通运输部“交通运输青年科技英才”，1 人获得中国科协青年人才托举工程项目支持，2 人分获中国交通运输协会科技英才人物奖和科技创新青年奖。

CRSC has strengthened the cultivation of scientific research talents, improved and optimized the employee incentive and reward mechanism. The Company actively promoted the construction of the enterprise's scientific and technological innovation talent team, strengthened the selection, adoption, cultivation and retention of the scientific and technological talent team, and stimulated the innovation vitality of the enterprise. By the end of 2021, the Company has a total of 4,374 R&D personnel. In 2021, CRSC added 10 new winners of Mao Yisheng Railway Engineer Award, 1 person won the Zhan Tianyou Achievement Award, 1 person won the Zhan Tianyou Youth Award, 2 People were awarded the "Young Talents in Transportation Science and Technology" by the Ministry of Transport, 1 was supported by the China Association for Science and Technology Young Talents Support Project, and 2 People were respectively awarded the "Science and Technology Talent Award" and "Science and Technology Innovation Youth Award" by the China Communication and Transportation Association.



知识产权管理 Intellectual Property Management

中国通号持续提升知识产权创造、运用、保护、管理和服务能力，管理体系日趋完善、发明专利数量显著提高、海外预警和布局能力不断增强、奖励激励机制不断健全，知识产权成为保障中国通号创新引领发展的重要支撑之一。截至 2021 年底，中国通号累计拥有有效授权专利 3,202 件，累计拥有发明专利 1,066 件，首次实现拥有授权发明专利数破 1,000 件的目标；累计海外授权专利 108 件；累计拥有软件著作权 1,517 项。

CRSC has continued to improve its intellectual property capabilities in IP creation, application, protection, management and service. The IP management system has been increasingly improved. The number of invention patents has increased significantly, the overseas early warning and distribution capabilities have been continuously enhanced, and the reward and incentive mechanism has been continuously improved. Intellectual property rights have become one of the important supports for innovation-led development of CRSC. . By the end of 2021, CRSC has a total of 3,202 valid licensed patents and a total of 1,066 invention patents, achieving the goal of having more than 1,000 licensed invention patents. Licensed overseas patents totaled 108. Software copyrights totaled 1,517.



2021 年中国通号专利情况 CRSC's Patents in 2021



2021 年中国通号规范知识产权工作进展

CRSC's work progress of to regulate intellectual property rights in 2021

□ 知识产权保护 Intellectual Property Protection

- 开展重点产品走出去目标国专利风险评估和预警工作，规避产品出口风险。
Carried out patent risk assessment and early warning for the exported key products to avoid product export risks.
- 制定《海外知识产权布局规划报告》，规划知识产权布局。
Formulated the "Overseas Intellectual Property Layout Planning Report" to plan the intellectual property layout.

□ 知识产权管理 Intellectual Property Management

- 持续推进国家标准《企业知识产权管理规范》(GB/T 29490-2013) 对标和体系认证工作，规范公司研发、采购、人事、生产各环节知识产权管理，累计 5 家通过对标认证。
Promoted the "national standard of Enterprise Intellectual Property Management" (GB/T 29490-2013) and system certification to standardize the Company's R&D, procurement, personnel, production and other aspects of intellectual property management with a total of 5 companies having passed the certification.
- 组织企业开展提升发明专利审查速度相关政策研究，部分企业平均审查时间由 24 个月降为 6 个月。
Organized enterprises to carry out policy research on patent policies to accelerate invention patents application, with the average examination time of some enterprises being reduced from 24 months to 6 months.

□ 知识产权服务 Intellectual Property Services

- 完成检索数据库的建设调研，组织研究设计院集团、卡斯柯公司分别开展专利管理系统建设和主流全球专利检索数据库试用。
Completed the research on the construction of the retrieval database, and organized the Research & Design Institute Group and CASCO to construct the patent management system and test the mainstream global patent retrieval database respectively.

案例 Case

自主研发基于 5G 通信的高铁智能辅助驾驶系统

Independently developed high-speed rail intelligent driving system based on 5G network

中国通号自主研发了基于 5G 通信的高铁智能辅助驾驶系统，该系统通过车载光学系统和 5G 通讯单元收集轨道和轨旁信息，智能识别轨道上可能出现的危险源，将信息及时显示在司机视野中的智能系统，提高司机在突发情况下安全驾驶的能力。该系统与公司高铁列车控制系统、自动驾驶系统结合，能有效地辅助司机正确处理突发事件，显著减少由于突发灾害等原因导致的事故发生，实现智能铁路科技创新重大突破，助力轨道交通高质量发展。

CRSC has independently developed the high-speed rail intelligent driving system based on 5G network, which could collect information along the track through the on-board optical system and 5G communication unit. It can intelligently identify possible sources of danger on the track, and timely display the information to the driver, which greatly improves the driver's ability to drive safely in front of emergencies. The system is combined with the existing high-speed train control system and automatic driving system, which can effectively assist drivers to correctly handle emergencies, significantly reduce accidents caused by sudden disasters and other reasons, which demonstrates a breakthrough in intelligent railway technology innovation, and helps high-quality rail transit development.

案例 Case

中国通号以科技保障拉林铁路正式开通运营

Technology empowers the official operation of the Lhasa-Nyingchi Railway

2021 年 6 月，拉（萨）林（芝）铁路正式开通运营，这是青藏高原第一条一级单线电气化铁路。中国通号承担拉林铁路全线通信、信号、信息、防灾专业的系统集成、设备采购和工程交付，并配合联调联试、试运行等工作。通过开展科技创新等手段，研制了壁挂式光缆卡具、隧道漏缆打孔车、液压升降式高空作业平台等新型实用专利项目。同时，提出优化车站铁塔视频控制箱安装方式、改进基站控制箱安装方式等 26 个工艺创新点，用匠心与智慧打造精品拉林。

In June 2021, the Lhasa-Nyingchi Railway was officially opened for operation, which is the first Class I single-track electrified railway on the Qinghai-Tibet Plateau. CRSC undertook the system integration, equipment procurement and project delivery of communications, signals, information and disaster prevention along the entire Lhasa-Nyingchi Railway. The Company was also responsible for the commissioning, testing and trial operation. Through scientific and technological innovation and other means, new and practical patent projects such as wall-mounted optical cable fixtures, in-tunnel leaky coaxial cable drilling vehicles, and hydraulic lifting aerial work platforms have been developed. At the same time, 26 technological innovations such as optimizing the installation method of the video control box of the station tower and improving the installation method of the base station control box were proposed to create a high-quality railway with ingenuity and wisdom.



2021 年 4 月，中国通号发明专利“一种轨道电路”（专利号：ZL201310566673.9）荣获北京市发明专利奖颁奖大会唯一一项特等奖
In April 2021, the invention patent "a track circuit" (Patent No.: zL201310566673.9) of China communications won the only special prize at the Beijing invention patent award ceremony

推进成果转化 Implementing Transformation of Achievement



中国通号认真贯彻落实习近平总书记关于加快推动科技成果转化应用的重要讲话精神，坚持技术成果化、成果市场化、市场效益化，充分发挥中国通号设计研发、装备制造和工程服务“三位一体”的综合优势，积极推进重点技术在城市轨道交通、铁路信号安全控制等多个领域实现自主化、工程化、产业化。

CRSC earnestly studied and implemented the spirit of General Secretary Xi Jinping's important speech on accelerating the transformation and application of scientific and technological achievements. Adhering to technological achievement, marketization of results, and market efficiency, CSRC gave full play to the "three-in-one" advantage of design and development, equipment manufacturing and engineering services, and actively promoted the realization of autonomy, engineering and industrialization of urban rail transit, railway signal safety control and other fields.

2021 年中国通号科技创新成果应用（部分）

Application of CRSC's scientific and technological innovation achievements in 2021 (Partial)

自主研发的基于北斗定位的移动闭塞列控系统完成现场多车追踪试验，实现了列控系统在重载铁路应用的一大创新性跨越，开启了北斗卫星导航系统在重载铁路应用的新篇章。

The self-developed moving block train control system based on BeiDou positioning completed the on-site multi-vehicle tracking test, realizing a major innovative leap in the application of the train control system in the heavy haul railway.

自主化 CTCS-3 级列控系统完成合安线自主化匹配型试验和考核，为自主化装备在中国高铁“走出去”第一单——雅万高铁的成功应用奠定坚实基础。

The CTCS-3 train control system along Hefei-Anqing High-speed Railway has completed the matching test and assessment, laying a solid foundation for the successful application of the self-developed equipment in the first "going out" order of China's high-speed rail - the Jakarta-Bandung High-Speed Railway.

区域轨道交通协同运输与服务系统完成研发，在重庆大竹林中心、重庆北站南广场站成功示范应用。

The coordinated transportation and service system for regional rail transit has been demonstrated and applied in Chongqing Dazhulin Center and South Square Station of Chongqing North Railway Station.

国内首个基于运行计划和实时位置实现自主资源管理、可主动间隔防护的列车自主运行系统（启骥 TACS 系统）完成现场开通。

The first train operation system supported by the TRANAVI Qiji TACS system that realizes autonomous resource management and active interval protection of trains has been completed on-site.

自主化全电子联锁系统圆满完成现场试验，取得空载试运行证书并开通运营，成为业内首个城轨自主化全电子联锁开通项目。

The fully electronic autonomous interlocking system successfully completed the field test, obtained the no-load trial certificate and opened for operation, becoming the industry's first fully electronic autonomous interlocking project for urban rail transit.

铁路货物运输综合调度指挥管理系统完成神华铁路包神线、神朔线示范应用。

The integrated dispatching command and management system for railway freight transportation has successfully applied to Baotou-Shenmu Line and Shenmu-Shuozhou Line of Shenhua Railway as the demonstration project.

道岔转换智能诊断、道岔钢轨断轨检查等系统在铁路局上道试用，运用效果良好。

The intelligent turnout diagnosis and the rail-break inspection of turnout have been put on trial in the railway bureau with a good result.

总集机电一体化、列车控制无人化、运营维护智能化、多交通制式运输协同化的智慧轻型轨道交通智能运输与控制系统在湖南凤凰磁浮投入试运行。

The intelligent light rail transit transportation and control system, which integrates mechatronics, unmanned train control, intelligent operation and maintenance, and coordinated multi-transportation mode, was put into trial operation in Fenghuang Maglev Project in Hunan.

完成城轨智能调度系统功能改进开发，形成智慧运营示范。

The urban rail intelligent dispatching system was successfully upgraded, which was a demonstration of intelligent operation.

适用于轨道交通的视频大数据服务平台，强化数据治理、提升数据质量，实现了数据资源充分共享、增值及综合应用，在城轨项目开始应用。

The video big data service platform for rail transit, which can improve data governance and data quality, and realize sharing, value-added and comprehensive application of data resources, has been applied in urban rail projects.

2021 年中国通号创新成果获奖情况

CRSC Innovation Achievement Awards in 2021

“面向网络化运营的互联互通 CBTC 关键技术及成套装备与示范应用”荣获中国城市轨道交通协会 2020 年度城市轨道交通科技进步特等奖；

"The key technology and complete sets of interconnected CBTC for network operation and their applications" won the 2020 Urban Rail Transit Science and Technology Progress Special Award of China Association of Metros;

“高速铁路列控系统测试检测系统”获得 2021 年中国检验检测学会科学技术奖特等奖；

"High-speed railway train operation control and detection system" won the 2021 Special Prize of Science and Technology Award of China Inspection and Testing Society ;

“基于列调融合的调度集中系统（CTC3.0）安全控制技术开发与应用”成果荣获中国交通运输协会 2020 年科技奖一等奖；

"The Development and Application of Safety Control Technology on Centralized Traffic Control System (CTC3.0) Based on Traffic Control Coordination" was awarded the 2020 1st prize of China Communications and Transportation Association;

“郑州北编组站综合自动化改造工程”获中国铁道工程建设协会年度铁路优秀工程勘察设计奖一等奖；

"Automation Reconstruction Project of Zhengzhou North Marshalling Yard" won the first prize of Annual Railway Excellent Engineering Survey and Design Award of China Association of Railway Engineering Construction;

“基于 5G 通信的高铁智能辅助驾驶系统”获得国资委第三届中央企业熠星创新创业大赛二等奖。

"The high-speed rail intelligent driving system based on 5G network" won the second prize of the 3rd SOEs Shining Star Innovation Competition awarded by SASAC.

案例 Case

卡斯柯公司无人驾驶系统引领智慧城市轨道交通

CASCO's driverless system leads smart urban rail transit

2021 年 1 月，中国通号卡斯柯公司参建开通的第 4 条自动化等级达到国际最高标准（GoA4 级）的线路——上海 15 号线正式载客运营。该线路是国内一次开通 GoA4 级里程最长的线路，采用全自动无人驾驶信号系统，实现列车运行的无人值守、无人干预，开放式驾驶室。截至目前，卡斯柯参建开通的上海 10 号线、成都 9 号线、上海 18 号线、上海 15 号线包揽了内地实现 GoA4 功能，且采用开放式驾驶室的全部全自动无人驾驶线路，开通总里程达 127 公里，领跑我国城轨全自动无人驾驶赛道，为我国城市轨道交通智能化发展注入智慧内核。

In January 2021, Shanghai Line 15, the fourth line with the highest level of automation in the world (GoA4) equipped by CASCO, was officially put into operation. This line is the longest line with GoA4 in China. It adopts a fully automatic unmanned signal system to realize unattended train operation without any on-train staff. Up to now, Shanghai Line 10, Chengdu Line 9, Shanghai Line 18, and Shanghai Line 15, which CASCO has participated in the construction and operation, have all realized the GoA4 function, with a total mileage of 127 kilometers. All these projects make CRSC lead China's urban rail full-automatic driverless track, demonstrating the wisdom in the intelligent development of China's urban rail transit.



案例 Case

中国通号技术创新打造国内首条磁浮文旅项目

CRSC's technological innovation to build the first domestic maglev cultural tourism project

2021 年 12 月，由中国通号负责机电总承包、国内首个“磁浮+文化+旅游”轨道交通项目——凤凰中低速磁悬浮机电设备采购及安装总承包工程项目正式进入全线试运行阶段。在项目施工过程中，中国通号积极发挥全产业链优势，对凤凰磁浮项目各专业方案进行了大量创新及优化工作，首次采用“一体化智能箱式变电所”“组合变流装置”“10KV 固体开关柜”等一系列创新产品，提出并实施“机电一体化”“云平台”等多项创新方案，致力于打造凤凰磁浮项目列车控制无人化、运营维护智能化、多交通制式运输协同化的凤凰磁悬浮智能一体化系统。该项目从设计、制造、施工到后期管理，均拥有国产自主化知识产权，把磁浮技术与文化旅游相融合，更是成为全球首个磁浮技术工程化、产业化的新探索。

In December 2021, the Fenghuang middle and low-speed Maglev Project of Mechanical and Electrical Equipment Procurement and Installation EPC - China's first "Maglev + Culture + Tourism" railway project, was put into trial operation across the board. During the implementation of the project, CRSC actively utilized the advantages of the whole industry chain, and carried out a lot of innovation and optimization on various schemes of the Fenghuang maglev project. A series of innovative products such as "Integrated intelligent box-type substation", "Combined converter device", "10KV solid state switch cabinet" are adopted. Several innovative solutions such as "mechatronics" and "cloud platform" are proposed and applied, creating unmanned train control, intelligent operation and maintenance, and multi-transportation mode for the Fenghuang maglev project. All the technologies, from design, manufacturing, construction to later management, are protected by independent intellectual property patents. The project integrates maglev technology with cultural tourism, and it's a new exploration of maglev technology engineering.



助力行业进步

Empowering Industrial Progress



中国通号秉承“发展轨道交通民族产业”的使命，积极参与中国铁路通信信号行业标准和规范制定，加强与政府、科研院所、行业协会等技术交流，共同带动行业可持续发展。

Adhering to the mission of "Develop National Industry of Rail Transportation", CRSC has actively participated in the formulation of industry standards and specifications, strengthened technical exchanges with the government, scientific research institutes, industry associations, etc., to jointly promote the sustainable development of the industry.

行业标准制定

Formulating Industry Standards

中国通号作为国家铁路局技术标准的归口单位，持续做好行业标准归口管理和编制工作，完成国家牵标委 SAC/TC278 成立通信信号分委会（SC2）组建的制度制定、标准体系规划工作，组织编制并发布《中国铁路通信信号工程数字化转型白皮书》。牵头 ISO/TC269《列车占用检查原则》国际标准特别工作组，召集 6 次国际专家会议，构建列车占用检查标准体系框架。作为国家铁路局技术标准的归口单位，截至 2021 年底，公司共归口管理现行有效行业标准 193 项，在编标准 21 项。

截至 2021 年底
公司共归口管理现行有效行业
标准

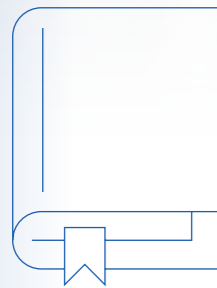
193 项

As of the end of 2021, CRSC has managed a total of 193 prevailing valid industry standards

As the responsible department technical standards of National Railway Administration of the People's Republic of China, CRSC continued to do the centralized management and compilation of industry standards. In 2021, the Company completed the rule-making and standard planning of the establishment of the Communication Signal Sub-Committee (SC2) for National Technical Administration of China (SAC/TC278). Besides, CRSC also organized and released the "White Paper on Digital Transformation of China Railway Signal & Communication Engineering". The Company also led the ISO/TC269 International Standard Working Group on "Principles of Train Occupancy Inspection", convened 6 international meetings and built a standard system framework for train occupancy inspection. As of the end of 2021, CRSC has managed a total of 193 prevailing valid industry standards and 21 in-process standards.

中国通号 2019-2021 年主参编国家及行业标准情况

CRSC's Participation in the Compilation of National and Industry Standards in 2019-2021



主参编国家标准 National standards

件 piece

2

2019

1

2020

2

2021

主参编行业技术标准 Industry standards

件 piece

13

2019

9

2020

9

2021

加强行业沟通 Strengthening Communication within Industry

中国通号是中国铁道学会通信信号分会的挂靠单位，大力支持通信信号分会创条件、搭平台、促服务，积极参加行业、协会交流论坛活动，努力提升技术品牌彰显行业影响力，推动行业发展新格局。深化与詹天佑科学技术发展基金会、北京茅以升科技教育基金会的合作交流，和中国铁道学会通信信号分会联合共同设立面向科技工作者的詹天佑通信信号专项奖（含詹天佑通信信号贡献奖、詹天佑通信信号青年奖）。联合发起成立中国工程师联合体并参加相关成立仪式，旨在服务工程科技人才实现价值、工程科技交流与合作。中国铁道学会通信信号分会连续 2 年获得中国铁道学会分支机构考核第一名，荣获“优秀分支机构”荣誉称号。

As an affiliated institution of the Communications Signal Branch of China Railway Society, CRSC has actively created conditions, built platforms, promote services for the Communications Signal Branch, participating in the exchange forums, which can enhance technology brands and show industry influence, and promote the new pattern of industry development. CRSC continued to strengthen the cooperation and exchanges with the Zhan Tianyou Science and Technology Development Foundation and the Beijing Mao Yi-sheng Science and Technology Education Foundation, and jointly set up the Zhan Tianyou Special Award for researchers with the Communications Signal Branch of China Railway Society (including Zhan Tianyou Communication Signal Contribution Award, Zhan Tianyou Communication Signal Youth Award). CRSC co-sponsored the Chinese Society of Engineer and participated in the founding ceremonies, aiming to serve the realization of value of engineering technology talents, and the exchange and cooperation of engineering technology. The Communications Signal Branch of China Railway Society has won the first place in the examination of branches of China Railway Society for two consecutive years, and won the honorary title of "Excellent Branch".



《中国铁路通信信号工程数字化转型白皮书》通过专家评审并于 12 月发布

"White Paper on Digital Transformation of China Railway Signal & Communication Engineering" passed expert review and released in December

案例 Case

中国通号携多项科技成果亮相 2021 北京国际城市轨道交通展览会暨高峰论坛

CRSC brought a number of scientific and technological achievements to the International Metro Transit Exhibition & Forum 2021 (Beijing)

2021 年 10 月，2021 北京国际城市轨道交通展览会暨高峰论坛在京盛大举行。中国通号携工控功能安全计算机平台、应答器传输系统、多功能车辆总线芯片等科研成果亮相展会，向公众呈现轨道交通领域最新最先进的技术设备、产品服务和解决方案。研究设计院集团在展会“未来轨道”板块，针对轨道交通未来的自主化、智能化趋势，展示行业领先科研成果，为轨道交通行业和产业链上下游企业提供技术引领。此外，公司多功能车辆总线芯片得到论坛组委会认可获评高分。该芯片的成功研发及自主化应用，打破国外垄断，帮助中国高速铁路通信信号装备摆脱对国外核心基础器件的依赖，在行业内具有跨时代的意义。

In October 2021, the International Metro Transit Exhibition & Forum 2021 (Beijing) was held in Beijing. CRSC appeared at the exhibition with scientific research achievements such as safety computer platform with industrial control, transponder transmission system, multi-function vehicle bus chip, etc., presenting the latest and most advanced products and solutions in the field of rail transit to the public. In the "Future Rail" section of the exhibition, Research & Design Institute Group displayed industry-leading research achievements in view of the future autonomous and intelligent trend of rail transit, leading the rail transit industry and upstream and downstream enterprises in the industrial chain. In addition, the Company multi-function vehicle bus chip was recognized by the forum jury. The R&D and independent application of this chip have broken the foreign monopoly and helped China's high-speed railway get rid of its reliance on imported components, which has trans-era significance in the industry.



《铁路智能通信网架构技术白皮书》《铁路通信智能运维技术白皮书》《铁路可信网络技术白皮书》通过专家评审并于 12 月发布
"Intelligent Railway Communication Network Architecture Technology White Paper" "Railway Communication Intelligent Operation and Maintenance Technology White Paper" "Railway Trusted Network Technology White Paper" passed the expert review and released in December

服务至上 铸就卓越品质

Creating Excellent Quality with the Mindset of Service First

中国通号坚持以习近平新时代中国特色社会主义思想为指导，立足新发展阶段，贯彻新发展理念，融入新发展格局，坚持人民至上，生命至上，统筹发展和安全，以“求实、创新、拼搏、奉献”的企业精神深耕于轨道交通控制系统行业，牢固树立“质量是生命，安全大于天”的理念，强化质量安全管理，为用户提供安全、稳定、优质的产品、技术和服务，大力推进数字化转型智能化升级，做好安全生产和应急管理应对处置，持续实现价值创造。

Adhering to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, CRSC bases itself on the new development stage, applies the new development philosophy, integrates into the new development pattern. Sticking to the principle of the people first, the life first, the Company continues to coordinate development and security. By the corporate spirits of "realism, innovation, endeavor and dedication" and the concept of "Quality is Life, Safety is Paramount", CRSC is deeply rooted in the rail transit control industry, firmly establishes the concept of strengthens quality and safety management, provides users with safe, stable and high-quality products, technologies and services. It vigorously promotes digital transformation and intelligent upgrades, good safety production and emergency management response to continuously create values.

58 优质产品与服务

Quality Products and Services

62 数字化转型与升级

Digital Transformation and Upgrade

65 安全生产与应急管理

Safe Production and Emergency Management

优质产品与服务 Quality Products and Services

中国通号严格遵守产品质量管理相关法律法规，制定《质量管控规则》《产品质量检验工作管理办法》《产品质量监督抽查管理办法》《产品质量安全事故（故障）管理办法》等制度规范，完善质量安全三级管控体系，明确质量责任，加强过程控制，推进精益化管理，严格将质量管理贯穿于全产业链的各个环节。

同时，中国通号及所属企业结合业务体系，构建涵盖客户隐私保护、客户投诉处理机制、创新服务方式等全生命周期的客户服务体系，回应客户关切，做好主动售后服务，共建公平诚信交易环境。

CRSC strictly abides by relevant laws and regulations on product quality management, and has formulated the "Quality Control Rules, Administrative Measures on Product Quality Inspection" "Administrative Measures on Product Quality Supervision and Inspection" "Administrative Measures on Product Quality and Safety Accidents (Faults)" and other institutional norms to improve three-level management and control system, clarify quality responsibilities, strengthen process control, promote lean management, and strictly implement quality management throughout all links of the entire industry chain.

At the same time, CRSC and its affiliated companies have combined their business systems to build a customer service system covering the entire life cycle of customer privacy protection, customer complaint handling mechanisms, responding to customer concerns. The Company does a good job in active after-sales service, and jointly builds a fair and honest trading environment.

2021 年，公司产品质量安全目标实现情况

In 2021, Achievement of CRSC's Product Quality and Safety Goals

01

杜绝了生产安全一般及以上责任死亡事故、特种设备一般及以上责任事故、火灾一般及以上责任事故。

It eliminated the "General-Level" or above accident of death, the "General-Level" or above special equipment accident and the "General-Level" or above fire accident.

02

杜绝了铁路交通一般 C 类及以上责任事故、工程质量一般及以上责任事故、较大及以上质量问题。

It eliminated the Category-C or above accident in railway traffic, the "General-Level" or above human element accident and "Severe-Level" or above accident due to quality problems.

03

杜绝了职业病、职业中毒事件、突发环境事件。

It eliminated occupational diseases, occupational poisoning incidents and environmental emergencies.

06

保障了在轨系统设备安全运行，实现了中国通号安全质量形势总体持续稳定。

CRSC continued to ensure the safe operation of on-track system equipment and realized the overall safety and quality of the continuous and stable situation.

05

新研发的安全关键产品和城轨信号系统集成项目 100% 实行第三方安全评估，涉及安全关键产品的软件实行 100% 独立安全测试。

100% of newly developed safety critical products and urban rail signal integration systems were subject to third-party quality safety assessments, and safety critical products was subject to 100% independent safety testing.

04

实现了各检验批、分项、分部工程施工质量检验合格率 100%，单位工程一次交验合格率 100%，行业产品质量监督抽查合格率 100%。

It achieved a 100% quality inspection pass rate of each inspection batch, sub-item and sub-project, a 100% engineering onetime delivery and acceptance pass rate, and a 100% quality supervision and inspection pass rate.

产品研发
Product R&D

明确关键质量控制点及控制要求，进行可靠性、安全性计算与分析，保证产品满足相应等级安全标准。

Specifying key quality control points and control requirements, conducting reliability and safety calculation and analysis, ensuring products meeting corresponding levels of safety standards.

出台《产品质量检验工作管理办法》，设立产品质量检验部门，完成产品入场、生产、出厂全流程的严格检验，建立产品质量检验档案，禁止不合格产品流出。

Issuing the "Administrative Measures on Product Quality Inspection", setting up product quality inspection department, strictly inspecting the whole process of entry, production and delivery of products, establishing product quality inspection records, prohibiting the outflow of unqualified products.

设备制造
Equipment Manufacturing

严格按照施工安装标准，加强施工安装过程安全分析和质量控制。

Strictly following construction installation standards, strengthening safety analysis and quality control during construction installation.

工程安装
Engineering Installation

细化产品使用说明书及培训教材，制定安全管控措施。

Detailing product instruction manuals and training materials, formulating safety prevention and controlling measures.

运营维护
Operation & Maintenance

提供产品检验、测试工作，识别并有效应对集成调试存在的管理与技术问题。

Providing product inspection and test, identifying and efficiently handling management issues and technical troubles existing in integration and commissioning.

集成调试
Integration & Commissioning

安全质量体系 Safety and Quality System

截至 2021 年底，中国通号及所属企业全部通过 ISO9001（质量）管理体系认证；工程建设施工企业全部通过 GB/T50430 标准认证；53 家所属企业全部通过了职业健康安全管理体系认证；23 家企业完成安全生产标准化企业创建工作；17 家所属企业通过 IRIS 体系认证审核；5 家所属企业通过 CMMI 认证。各企业深入推进各项质量安全工作，构建一体化的质量安全体系。

By the end of 2021, CRSC and its subsidiaries have all passed ISO9001 (Quality) Management System certification; All engineering construction enterprises have passed the GB/T50430; 53 affiliated enterprises have passed the occupational health and safety management system certification; and 23 enterprises have completed the establishment of safety production standardization enterprises; 17 affiliated companies passed the IRIS Certification audit; 5 affiliated companies have passed CMMI certification. All enterprises have further promoted various quality and safety management work and built an integrated quality and safety system.

产品质量控制 Product Quality Control

中国通号全面开展安全产品 RAMS 分析和设计，细化失效模式与影响分析（FMEA）等质量工具应用，加强产品可靠性管理。制定产品质量检验工作管理办法、产品质量监督抽查管理办法等，所属企业建立检验、检测程序、产品和服务质量问题程序、全生命周期可追溯管理程序等。

CRSC has comprehensively carried out RAMS analysis and design of safety products, refined the application of quality tools such as Failure Mode and Effects Analysis (FMEA), and strengthened product reliability management. It also formulated the Administrative Measures on Product Quality Inspection and the Administrative Measures on Product Quality Supervision and Inspection. Its subsidiary enterprises set up the inspection and testing procedure, the product and service quality issue procedure, the full-life cycle traceable management procedure, etc.

产品安全保障 Product Safety Guarantee

中国通号以尊重生命、保障安全为承诺，致力于为客户提供安全产品。公司对涉及核心安全的产品按照欧洲铁路产品安全管理标准 EN50126、EN50128、EN50129 加强产品安全性管控。公司交付的轨道交通控制系统共有 73 项产品通过了英国劳氏、德国 TUV 等机构出具的 SIL4 第三方评估证书。2021 年，公司完成 122 项安全认证，完成 83 个软件工具认证。

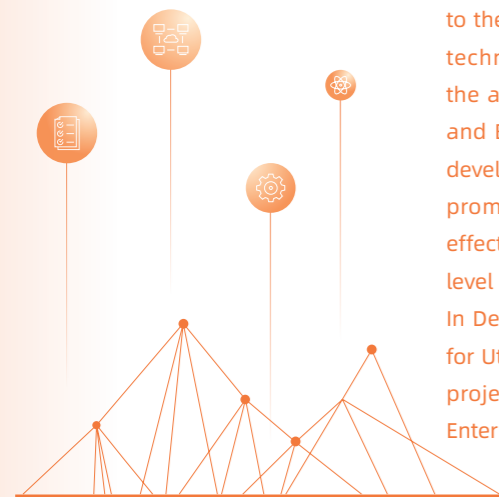
CRSC is committed to respecting life and ensuring safety, and is committed to providing customers with safe products. The products involving core safety risk were controlled and tested in accordance with the European railway product safety management standards EN50126, EN50128, and EN50129. A total of 73 rail traffic control systems delivered by CRSC have passed the SIL4 certificates issued by Lloyd's Register, Germany's TUV and other institutions. In 2021, the Company completed 122 security certifications and 83 software certifications.

数字化转型与升级

Digital Transformation and Upgrade

中国通号深刻认识到信息化、数字化技术对企业发展的重要性，大力开展集成创新、技术创新，强化数据驱动，积极推进人工智能、北斗通信等新一代信息技术应用。各所属企业积极探索数字化发展规划，推广新技术，推进生产运营智能化、用户服务敏捷化，切实提高信息化管理体系建设和数字化水平，为企业构筑坚实的高质量发展基础。2021 年 12 月，公司《通信信息集团综合管廊无人智能化管理系统》和《通信信息集团智能轨道交通视频系统》项目入选中央企业数字化发展研究院首批企业数字化转型典型场景优秀案例。

CRSC deeply recognizes the importance of informatization and digital technology to the development of enterprises, vigorously carries out integrated innovation, technological innovation, strengthens data-driven, and actively promotes the application of the new generation of information technology including AI and Beidou communication. All affiliated enterprises actively explores digital development plans and new technology promotion, promotes new technologies, promotes the intelligent production and operation and user services agility, effectively improves the information management system construction and the level of digitization, and builds a solid foundation for high-quality development. In December 2021, the Company's "Unmanned Intelligent Management System for Utility Tunnel of CRSCIC" and "Intelligent Rail Transit Video System of CRSCIC" projects were selected as the first batch of outstanding cases by the Central Enterprise Digital Development Research Institute.



核心业务系统基本建成

The Core Business System Is Basically Completed

信息基础设施初具规模，形成一中心（数据中心）、一张网（企业内网）、一令牌（统一身份认证系统）的体系结构。初步建立信息化应用体系，建设中国通号网站群、ERP、PLM、办公自动化等系统，打造全产业链信息化架构，加快智能化、数字化企业建设。

The information infrastructure has begun to take shape, formed an architecture of one center (data center), one network (enterprise intranet), and one token (unified identity authentication system). The Company has preliminarily established an information application system, covering CRSC website groups, ERP, PLM, office automation and other systems, build an information architecture for the entire industry chain, and speed up the construction of intelligent and digital enterprises.

网络安全防护持续加强

Cybersecurity Continued to Strengthen

贯彻落实网络安全法，颁布安全管理制度和操作规程，配合公安部网络安全检查，开展网络安全专项建设。对标国际信息安全标准，开展评估与认证活动。建设网络系统日志系统，构建关键信息系统的数据库审计系统。开展 IPv6 升级改造、国资国企安全监管平台和保密监管平台建设。

CRSC has implemented the Cybersecurity Law, promulgated security management and operating procedures, conducted cybersecurity inspections led by the Ministry of Public Security, carried out special construction of network security. Benchmarking international information security standards, the company has carried out evaluation and certification activities, built a network log system, and a database audit system for key information systems. IT also has carried out the IPv6 upgrade and transformation, completed the state-owned enterprise security supervision platform and confidentiality supervision platform.

优化信息系统，提升信息化资源整合和系统集成水平，强化信息化业务支撑和管理规范。持续优化运维流程，完善三级运维体系，提高问题响应速度。培养专业化的建设及运维队伍，形成一体化信息化服务产业。

CRSC has optimized the information system, improved the level of informatization resource integration and system integration, and strengthened informatization and management standards. CRSC has continuously optimized the process to improve the three-level operation and maintenance system, and speed up the problem response. By a professional construction and operation and maintenance team, CRSC has formed an integrated information service industry.

信息化运维保障稳步推进

Steady Progress in Informatization Operation and Maintenance

企业融合应用建设成效显著

Remarkable Achievements in Technology Application

积极推进信息技术在物资采购、工程管理、市场经营、财务管理等方面的应用，通过 ERP、OA 协同办公、合同管理、资金管理系统，实现各业务管理全过程的信息化和业务闭环。通过开展集成应用建设，打通和上游业务接口，使产品发布、生产设计、变更执行等环节沟通反馈更为畅通。

CRSC has actively promoted the application of information technology in material procurement, project management, market operation, financial management, etc.. Through ERP, OA, contract management, fund management and other systems, the company has achieved informatization and closed-loop in the entire process of business management. Through integrated applications, the interface with the upstream business has been opened up, so that the communication and feedback in the links of product release, production design, and change implementation are more smooth.

打造轨道交通信号系统产品智能制造示范工厂，建设高标准智能化转辙机组装线、继电器精调线、自动探伤线、智能仓储和智能物流。打造高铁列控系统装备智能生产基地，逐步实现设计协同化制造柔性化、决策智能化的新型生产经营模式。

CRSC has built a demonstration factory for intelligent manufacturing of rail transit signal system products, and built high-standard intelligent switch machine assembly lines, relay fine-tuning lines, automatic flaw detection lines, intelligent warehousing and intelligent logistics. CRSC has built an intelligent production base for high-speed train control system equipment, and gradually realized a new production and operation model with flexible design, collaborative manufacturing, and intelligent decision-making.

智能工厂建设不断深入

Smart Factory Construction Continues to Implement



中国通号数字化转型案例
CRSC Digital Transformation Cases

通号工程局集团
Engineering Group

自主研发国内首套铁路通信信号基础模型涵盖设备、板卡、典型车站配置模板共计 712 套，并在国内首个自主 BIM 基础建模软件上成功实现搭载；研发 5 大类 68 项智能施工装备，保障工艺质量、现场安全，智能敷缆车、智能布线机器人、基于北斗的安全防护系统等新装备推广应用。

Independently developed the first set of railway communication signal basic model in China, which encompassed a total of 712 sets of equipment, PC boards, and typical station configuration templates, and was successfully implemented on the first independent BIM basic modeling software of China. 68 items of intelligent construction equipment in 5 categories have been developed to ensure process quality and site safety, and promote the application of new equipment such as intelligent cable car laying, intelligent wiring robots, and BeiDou-based safety protection systems.

通号建设集团
Construction Group

加快推进信息化建设和 BIM 技术应用。2021 年编制完成《通号建设集团信息化项目建议书》和《通号建设集团信息化项目可行性研究报告》；完成公司信息化管理体系建设的前期方案筹划和本级决策工作；完成 5 个项目 BIM 技术培训和 4 个项目 BIM 工作站建设。

Accelerated the promotion of informatization and the application of BIM technology. In 2021, the company compiled the "Informatization Project Proposal of CRSC Construction Group" and the "Project Feasibility Study Report of CRSC Construction Group", completed the preliminary planning and decision-making of the company's information management system, conducted 5 BIM technical training and constructed 4 project BIM workstation.

上海工程局集团
Shanghai Engineering Group

针对企业数字化转型开展一系列调研，形成“十四五”数字化转型子规划，明确“以项目管理为主线，以成本管理为核心”的数字化转型方向，初步建立工程项目管理平台，完成并上线成本管理功能模块，实现应用系统数据交互。

Carried out a series of investigations on the digital transformation of enterprises, formed a sub-plan for digital transformation in the "14th Five-Year Plan", specified the direction of digital transformation with "project management as the main line and cost management as the core", initially established a project management platform, completed and launched the cost management function module to realize the data interaction of the application system.

研究设计院集团
Research & Design Institute Group

完成 MES 系统上线运行，实现了物料批次追溯全覆盖，生产过程关键工艺及质量参数监控的数字化、可视化、无纸化；同时完善生产调度指挥中心系统，实现生产集中度指挥与产线看板相结合的双重管理指挥机制，整个产品制造过程的安全质量监控及预防体系正在逐步实现数字化，生产过程更加透明可控。

Completed the online operation of MES system, realized full coverage of material traceability, and the digitalization, visualization and paperless monitoring of key processes and quality parameters in the production process. At the same time, improved the production dispatching command center system, realized a dual management command mechanism combining centralized production dispatching command and production line kanban. The safety and quality monitoring and prevention system of the entire manufacturing process is gradually realizing digitalization, and the production process is more transparent and controllable.

安全生产与应急管理 Safe Production and Emergency Management



中国通号严格遵守《中华人民共和国安全生产法》《国家安全生产事故灾难应急预案》《中华人民共和国消防法》等相关法律法规，建立全员安全责任制，确保安全质量责任落实到位、规章制度执行到位、风险隐患防范到位、监督检查执法到位、事故事件整治到位。

CRSC strictly abides by relevant laws and regulations such as the "Work Safety Law of the People's Republic of China" "National Disaster Emergency Response Plan for Work Safety Accidents" "Fire Protection Law of the People's Republic of China", and has established a safety responsibility system to ensure that safety and quality responsibilities are implemented in place, rules and regulations are implemented in place, risks and hidden dangers are prevented in place, supervision, inspection and law enforcement are in place, and accidents and incidents are rectified.

安全生产管理 Safe Production Management

中国通号坚持“管生产经营必须管安全、管业务必须管安全”的原则，成立以董事长为主任的安全生产管理委员会，管理安全生产工作。通过动员部署、排查整治和集中攻坚三个阶段的扎实工作，安全生产责任体系更加完善，双重预防机制更加健全，安全生产标准化更加规范，安全生产信息化更加高效，安全运营更加可靠。2021 年，公司累计投入安全生产资金 4.32 亿元，未发生生产安全一般及以上、重伤事故，未发生特种设备、火灾一般及以上责任事故。

2021 年
公司累计投入安全生产资金

4.32 亿元

In 2021, the Company invested a total of 432 million yuan in production safety

CRSC adheres to the principle of "Managing production and operation must be in charge of safety, managing business must be in charge of safety", and has established a safety production management committee headed by the chairman to manage the work of safety production. Through the solid work of mobilization and deployment, investigation and rectification, and concentrated efforts, the safe production responsibility system has been further improved, the dual prevention mechanism has been more sound, the work safety standardization has become more standardized, the work safety information has become more efficient, and the work safety operation has become more reliable. In 2021, the Company invested a total of 432 million yuan in production safety, and there was no accident of general or above production safety or serious or light injury, and no accident of general or above responsibility for special equipment or fire.

安全生产专项整治三年行动 Three-Year Dedicated Rectification Actions for Safe Production

2021年，中国通号聚焦集中攻坚年的任务目标，狠抓重点难点问题整改落实。组织观看“生命重于泰山”专题片，聘请专家解读习近平总书记关于安全生产重要论述，全系统共计3万余人次参加了学习和培训，提高了全员底线思维和忧患意识，进一步树牢安全发展理念；加强注册安全工程师队伍建设，积极开展注册安全工程师取证工作，为安全生产管理奠定了基础；加大专项整治集中攻坚力度，动态更新“两个清单”，落实整改措施2186项，整治工作取得明显成效；积极组织现场经验交流推进会并制作经验交流宣传片，推广先进管理方法和典型经验，深入推进专项整治三年行动，促进了管理水平的整体提升。

In 2021, CRSC focused on the tasks and objectives of the critical year, and paid close attention to the rectification and implementation of key and difficult problems. The Company organized its employees to view the feature film of "Life Always Prevails", and invited experts to interpret General Secretary Xi Jinping's important discussion on production safety. more than 30,000 people participated in learning and training, which improved the bottom-line thinking and awareness of potential dangers, and further strengthened the concept of safe development. CRSC strengthened the construction of the registered safety engineer team, actively carried out the certification of the registered safety engineer to laid a foundation for the safety production management. Besides, it also intensified efforts to focus on special rectification, dynamically updated the "two lists", implemented 2,186 rectification measures, and achieved remarkable results in the rectification. CRSC organized on-site experience exchange promotion meetings and produced experience exchange promotional videos to promote advanced management methods and typical experiences, and the three-year special rectification action, which promoted the overall improvement of the management level.

中国通号以“压实全员安全生产责任、从根本上消除事故隐患”为主题，以安九高铁项目为依托，搭建中国通号安全生产专项整治三年行动观摩交流展区

With the theme of "To consolidate the responsibility of all employees for work safe to fundamentally eliminate potential accidents" and relying on the Anqing-Jiujiang high-speed railway project, CRSC has built a three-year action observation and exchange exhibition for CRSC's special work safety rectification



安全生产风险防控 Risk Prevention and Control of Safe Production

中国通号筑牢安全生产意识，加强安全风险辨识和评价，建立危险源和安全生产风险数据库，对安全生产风险进行分级管控，落实风险管控措施；制定《中国通号安全生产检查制度》，定期开展安全生产检查及隐患进行全方位排查，利用安全生产双重预防机制，有效提升安全管理水平。2021年，公司所属企业组织安全生产检查和隐患排查，发现安全问题后积极推进事故隐患整改，为迎接建党100周年作出应有贡献。

安全培训与教育 Safety Training and Education

中国通号始终坚持“安全第一、预防为主、综合治理”的方针，制定实施《中国通号安全生产教育培训管理办法》，加强员工安全培训及教育，建立员工安全培训教育档案，监督培训落实。2021年，公司组织开展“安全生产月”“职业病防治法宣传周”“安全生产法宣传周”等活动，50,000余人次参与。

Adhering to the policy of "safety first, prevention first, with comprehensive management", CRSC has formulated and implemented the "Administrative Measures for Workplace Safety Education and Training" to strengthen employee safety training and education, established employee safety training and education files, and supervised the implementation after the training. In 2021, CRSC organized activities such as "Safety Production Month" "Occupational Disease Prevention Law Publicity Week" and "Safety Production Law Publicity Week", with more than 50,000 people participating.



CRSC has continued to strengthen the awareness of work safety and the identification and evaluation of safety risks, established databases of hazard sources and work safety risks, carried out hierarchical management and control of work safety risks, and implemented risk control measures. The "CRSC Work Safety Inspection System" has been formulated to clarify that regular safety inspections and all-round investigation of hidden dangers should be carried out. The double prevention mechanism of safety production has been used to effectively improve the level of safety management. In 2021, the affiliated enterprises organized safety inspections and hidden danger investigations, actively promoted the rectification of hidden dangers after discovering safety problems, and making due contributions to the 100th anniversary of the founding of the Party.

安全应急管理与演练 Emergency Management and Drills

中国通号印发《突发事件总体应急预案》，明确应急管理的领导机构、办事机构、工作机构、基层机构、专家组、现场机构等组织体系。2021年，加强应急体系建设，修订完善生产安全事故应急预案353个。截至目前，公司共有应急预案1,880个，其中综合应急预案162个、专项预案622个、现场处置方案（应急处置卡）1,096个，应急体系得到进一步完善。同时，公司高度重视应急培训演练，组织各类事故应急演练加大应急演练和评估工作，提升人员应急能力。全年组织开展火灾、触电、机械伤害、高空坠落等应急演练489次。

CRSC has issued the "Overall Response Plan for Emergencies", specified the organization of emergency management such as leading agencies, working agencies, grass-roots agencies, expert groups, and on-site agencies. In 2021, the emergency response system was strengthened, and 353 emergency plans for work safety were revised and improved. Up to now, the Company has a total of 1,880 emergency plans, including 162 comprehensive emergency plans, 622 special plans, and 1,096 on-site disposal plans (emergency disposal cards). The emergency response system has been further improved. Meanwhile, the Company attaches great importance to emergency training and drills, organizing various types of accident emergency drills and enhance emergency drills and evaluation to improve personnel's emergency response capabilities. Throughout the year, 489 emergency drills for fire, electric shock, mechanical injury, and falling from heights were organized.

2021年6月，通号轨道公司开展消防培训及应急演练
In June 2021, CRSC Rail Company carried out fire response training and emergency drills

绿色赋能 践行“双碳”目标

Practicing "Carbon Peak & Carbon Neutrality" with Green Empowerment

中国通号坚持以习近平生态文明思想为指导，深入贯彻落实党中央、国务院以及国资委关于碳达峰碳中和工作要求，积极践行“绿水青山就是金山银山”的发展理念，倡导资源能源节约，推动绿色低碳技术创新，最大限度地减少废水、废气、废物排放，构建绿色低碳循环发展体系，多措并举减少环境污染，形成绿色发展方式和生活方式，以绿色低碳赋能高质量发展，为实现“双碳”目标贡献通号力量。

Adhering to the guidance of Xi Jinping ecological civilization thought, CRSC thoroughly implements the requirements of the CPC Central Committee, the State Council and the State-owned Assets Supervision and Administration Commission for carbon neutralization, actively implements the development concept of "lucid waters and lush mountains are invaluable assets", and advocates resources conservation, promotes green and low-carbon technology innovation, minimizes waste water, waste gas, and waste discharge, builds a green and low-carbon circular development system. The Company has taken multiple measures to reduce environmental pollution, form a green development method and lifestyle, and empower energy with green and low-carbon high-quality development, contributing to the realization of the "Carbon Peak & Carbon Neutrality" goal.

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03

节约能源资源 Saving Energy Resources

中国通号严格遵守《中华人民共和国环境保护法》《中华人民共和国清洁生产促进法》《中华人民共和国节约能源法》及所在运营地的环保法律法规，依法接受国家和所在运营地能源节约与生态环境保护相关部门的监督管理，公司各企业全部完成环境管理体系 ISO14001 认证。制定《中国通号能源节约与生态环境管理办法》，明确职责分工，推动绿色发展融入生产过程。

2021 年，中国通号加快高耗能、高污染工艺装备的淘汰，加快节能低碳新技术、新工艺、新产品的示范与应用推广，推行绿色制造，推广节水技术和工艺，提高能源节约和资源循环利用水平。推进化石能源清洁高效利用，严格控制煤炭消费，推动煤电向支撑性和调节性电源转型，严格控制新增煤电项目，持续淘汰煤电落后产能，积极有序推进煤炭替代和煤炭清洁化改造。其中，液化气使用量同比下降 14.1%，热力消耗同比下降 29.3%。

CRSC continued to strictly abide by the "Environmental Protection Law of the People's Republic of China", the "Cleaner Production Promotion Law of the People's Republic of China", the "Energy Conservation Law of the People's Republic of China" and the environmental protection laws and regulations of the place where it operates. Besides, the Company accepts the supervision and management of the relevant departments of energy conservation and ecological supervision according to law. All enterprises of the Company have completed the ISO14001 certification of environmental management system. CRSC has formulated the "CRSC Energy Conservation and Ecological Environment Management Measures" to clarify the division of responsibilities, and promote the green development integrating into the production process.

In 2021, CRSC accelerated the elimination of high-energy-consuming and high-polluting process equipment, sped up the application and promotion of new energy-saving and low-carbon technologies, processes and products, promoted green manufacturing and water-saving technologies and processes, and improved the level of energy conservation and resource recycling. We promoted clean and efficient utilization of fossil energy, strictly and reasonably controlled coal consumption, actively transformed the use of coal to electrical power. We strictly controlled the increase of coal power projects, continuing to eliminate outdated coal-supported capacity, and actively and orderly promoted coal substitution and coal cleaning. Among them, the use of liquefied gas decreased by 14.1% year-on-year, and the heat consumption decreased by 29.3% year-on-year.

中国通号 2019-2021 年度制成品包装消耗量

CRSC Packing Material Consumption for Finished Products in 2019-2021

包装材料类型 Packaging material type	生产制造包装用料 Manufacturing packaging materials			建筑工程包装用料 Engineering packaging materials	
	纸箱 Carton	木材 Timber	塑料 Plastic	塑料 Plastic	金属 Metal
	吨 ton	吨 ton	吨 ton	吨 ton	吨 ton
2019	321.5	3,849.1	37.3	8.2	109.8
2020	293.3	3,339.7	34.0	38.9	119.9
2021	247.5	2,800.9	27.4	20.9	455.3 ¹

注 1：因通号工程局集团所属建设公司工程项目持续时间较长，部分项目在 2021 年将 2020 和 2021 年产生的金属包装材料与建筑垃圾集中处理并统计，故该处与前两年数据相比变化较大。

Note 1: Since the construction projects of the Construction Company affiliated to Engineering Group last for a long time, some projects in 2021 centrally treated and counted the metal packaging materials and construction waste produced in 2020 and 2021. Therefore, there are great changes compared with the data of the previous two years.

中国通号 2019-2021 年度能源资源消耗情况

CRSC Energy and Resource Consumption in 2019-2021

能源类型 Energy type	电力 Electricity	液化气 Liquefied gas	汽油 Gasoline	柴油 Diesel fuel	热力 Heating power	天然气 Natural gas
	兆瓦时 MWh	立方米 m ³	吨 ton	吨 ton	百万千焦 million KJ	立方米 m ³
2019	92,216.8	149,292.1	3,997.1	2,786.6	85,202.6	2,994,306.2
2020	80,719.1	87,154.2	3,848.1	1,037.2	122,483.6	2,230,187.0
2021	109,700.0	74,883.0	3,800.0	1,606.3	86,601.8	2,952,281.6

中国通号 2019-2021 年度能源资源消耗情况²

CRSC Energy and Resource Consumption in 2019-2021

能源类型 Energy type	用水量 Water consumption	用水强度 Water consumption intensity	综合能源消耗量 Comprehensive energy consumption	综合能源消耗强度 Comprehensive energy consumption intensity
	吨 ton	吨 / 万元 ton/10,000 yuan	吨标煤 tce	吨标煤 / 万元 tce/10,000 yuan
2019	1,164,700	0.27	45,196	0.01
2020	1,093,600	0.27	41,130	0.01
2021	938,003	0.24	25,955	0.01

注 2：因统计口径变化，故对表中往年数据进行更新。

Note 2: Due to the change of statistical caliber, the data of previous years in the table have been updated.

中国通号集团所属企业节能措施（部分）

Energy Conservation Measures of CRSC's Subsidiaries (Partial)

研究设计院集团 Research & Design Institute Group

通过对研发设计、科研管理、流程优化等进行改进，强化科研协同开发，提升研发效率，降低了科研能耗。研究设计院集团新型列控系统面向西部铁路应用，结合北斗推广应用的国家级需求，采用基于北斗卫星的列车自主定位技术和列车完整性检查技术实现系统架构创新，构建简约化的新型列车运行控制系统架构，使得系统建设成本和维护成本降低 1/4 以上。

Through the improvement of R&D design, scientific research management, process optimization, etc., the Company emphasized the coordinated development of technology with production to improve the efficiency of R&D and reduce the energy consumption. The new train control system of the Research & Design Institute Group is oriented to the application in the western railway. Combined with the national strategic of the promotion and application of BeiDou, it achieved system architecture innovation by using the BeiDou satellite-based train autonomous positioning technology and train integrity inspection technology, and built a simplified the train operation control. The system architecture reduces the system construction cost and maintenance cost by more than 1/4.

西安工业集团西信公司 Xixin Company of (Xi'an) Industry Group

建成集装配制造、物流仓储、质量管控于一体的转辙机装配和继电器组调试自动化生产线，实时采集生产过程质量数据，精确追溯实际产量、一次交检合格率和返修情况，监督质量状态，防止批量性质量问题，提高生产加工质量一致性，实现安全可控、低碳环保的智能绿色制造能耗。

It built an assembly and debugging automatic production line for switch machine and relay, which integrates assembly manufacturing, logistics and warehousing, and quality control. This line can collect real-time quality data in the production process, accurately trace actual output, inspect pass rate and repair status, supervise quality status, and prevent batch quality problems. It improves the consistency of production and processing quality, and achieves safe, controllable, low-carbon manufacturing.

城交公司 Urban Rail Transit Company

实验室实施照明系统、设备电源系统自动化管理，降低实验室供电能耗；将 ATP、ATO、ZC、CI、ATE 软件 PC 化，信号系统整体上云，整合 IT 资源，提高资源利用率和测试效率，降低实验室运行能耗；研制智能化节能 ATO 系统，实现列车自动调整节能行车曲线，在系统集成项目中推广应用，为城市轨道交通运营部门降低列车牵引能耗。

The laboratory has implemented automatic management of lighting system and power supply system to reduce the energy consumption of laboratory power supply. It developed PC-based ATP, ATO, ZC, CI, ATE software. The signal system was managed by cloud technology as a whole. It integrated IT resources to improve resource utilization and testing efficiency, and reduce laboratory operating energy consumption. The intelligent energy-saving ATO system was developed to realize the automatic adjustment of the energy-saving running curve of the train, which is promoted and applied in the system integration project to reduce the energy consumption of train traction.

温室气体减排

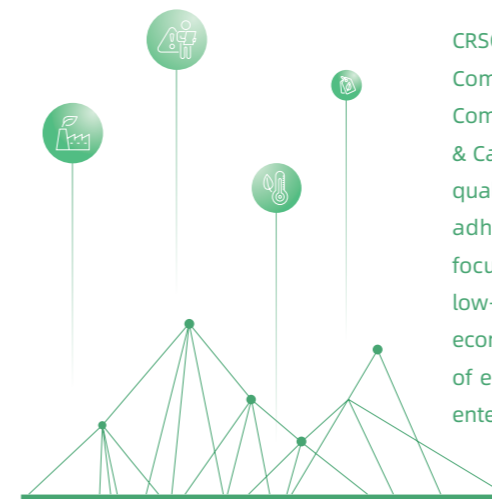
Reducing Emissions of Greenhouse Gases

中国通号认真贯彻落实《中共中央 国务院关于完整准确全面贯彻新发展理念做好碳达峰碳中和工作的意见》以及国资委《关于推进中央企业高质量发展做好碳达峰碳中和工作的指导意见》，坚持系统观念，以结构调整为主线，以绿色低碳转型发展为着力点，以低碳技术创新为支撑，不断增强企业经济竞争力、创新力、控制力、影响力、抗风险能力，推动企业绿色低碳高质量发展，打造具有全球竞争力的世界一流企业。

中国通号加强统筹协调，健全激励约束机制，加快构建有利于“双碳”工作的经济布局 and 结构。成立落实“双碳”工作领导小组和工作小组，制定印发《中国通号落实碳达峰碳中和行动方案》，确定总体要求、主要目标、具体措施等内容，贯穿企业生产经营全过程和各环节。其中，具体措施包括推动绿色低碳转型发展、建立绿色低碳循环产业体系、构建清洁低碳安全高效能源体系、强化绿色低碳技术科技攻关和创新应用、建立完善碳排放管理机制、加强组织实施等，全面推进温室气体减排工作。

中国通号把节约能源资源放在首位，提高利用效率，大力推进绿色低碳转型升级，持续降低单位产出能源资源消耗和碳排放，从源头减少二氧化碳排放。充分发挥企业创新主体作用，强化科技创新和制度创新，提升高质量绿色产品服务供给能力，加速绿色低碳关键技术产品推广应用。2021 年，中国通号温室气体排放量为 97,067.01 吨，其中，范畴一温室气体排放量为 23,486.98 吨，范畴二温室气体排放量为 73,580.03 吨；温室气体排放强度为 0.0253 吨 / 人民币万元³。

CRSC conscientiously implemented the "Opinions of the Central Committee of the Communist Party of China and the State Council on Completely, Accurately and Comprehensively Implementing the New Development Concept for Carbon Peak & Carbon Neutrality" and the SASAC's "Guiding Opinions on Promoting the High-quality Development of SOEs for Carbon Peak & Carbon Neutrality". The Company adhered to the system concept, took structural adjustment as the main line, focused on green and low-carbon transformation and development, and took low-carbon technological innovation as the support to continuously enhance the economic competitiveness, innovation, control, influence, and anti-risk capabilities of enterprises, to promote low-carbon, green and high-quality development of enterprises, and build a world-class enterprise with global competitiveness.





CRSC continued to strengthen overall planning and coordination, improve the incentive and restraint mechanism, and accelerates the construction of an economic layout and structure that is conducive to "Carbon Peak & Carbon Neutrality". CRSC established the leading group and the working group to implement the "dual carbon" work, formulated the "CRSC Working Plan for the Implementation of Carbon Neutralization Actions", which specifies the overall requirements, main goals, specific measures, etc., throughout the entire production and operation process. Among them, specific measures include promoting green and low-carbon transformation and development, establishing a green and low-carbon recycling industry system, building a clean, low-carbon, safe and efficient energy system, strengthening scientific and technological research and innovative applications of green and low-carbon technologies, improving the carbon emission management mechanism, strengthening organization and implementation etc., which are all aiming at comprehensively promoting the reduction of greenhouse gas emissions.

CRSC put energy conservation in the first place. We improved utilization efficiency, vigorously promoted green and low-carbon transformation and upgrading, continued to reduce energy and resource consumption and carbon emissions per unit of output, and reduced carbon dioxide emissions from the source. Giving full play to the main role of enterprises in innovation, the Company also strengthened technological innovation, improved the supply capacity of high-quality green products and services, and accelerated the application of green and low-carbon key technology products. In 2021, CRSC's greenhouse gas emission was 97,067.01 tons, of which, Category 1 greenhouse gas emissions was 23,486.98 tons, and Category 2 was 73,580.03 tons. The greenhouse gas emission intensity was 0.0253 tons/10,000 RMB³.

注 3：本公司温室气体排放参考《2006 年 IPCC 国家温室气体清单指南》《企业温室气体排放核算方法与报告指南 发电设施（2021 年修订版）》等文件排放因数，进行统计核算。

Note 3: For CRSC's greenhouse gas emissions, please refer to "2006 IPCC Guidelines for National Greenhouse Gas Inventories" and "Guidelines for Accounting Methods and Reporting of Greenhouse Gas Emissions by Enterprises Power Generation Facilities (revised in 2021)".

温室气体减排措施

Greenhouse Gas Emissions-reduction Measures

绿色研发 Green R&D

- 优先选用节能环保技术方案，采用低能耗的元器件和设备配置，把控源头
- 研发绿色出行解决方案，通过技术优化，助力低碳排放
- Give priority to energy-saving and environmental protection technical solutions, adopt low-energy components and equipment configuration, and control the source
- Develop green travel solutions, and facilitate low-carbon emissions through technological optimization

绿色工程 Green Engineering

- 建立建设工程项目环保管理制度，规范能源资源使用
- 加强对供应商的管控，采用更低碳、环保的材料
- Establish an environmental protection management system for construction projects and standardize the use of energy resources
- Strengthen the control of suppliers and use lower-carbon and environmentally friendly materials

绿色制造 Green Manufacturing

- 采用高环保标准设施及系统，对能耗较大生产设备升级更换
- 加强对生产过程的控制，保障产品质量、提升产品性能的同时，降低能耗
- Adopt high environmental protection standard facilities and systems, upgrade and replace production equipment with high energy consumption
- Strengthen the control of the production process, ensure product quality, improve product performance, and reduce energy consumption

绿色办公 Green Office

- 推广使用 LED 灯，公共廊道使用声光控制系统
- 采用更集约的空调系统、控制空调运作时间
- 推行无纸化办公、纸张重复利用
- 及时关闭非必要照明排风、显示器、采光灯、开水炉等
- Promote the use of LED lights and use sound and light control systems in public corridors
- Adopt more intensive air-conditioning system and control the operation time of air-conditioning
- Promote paperless office and paper reuse
- Timely turn off unnecessary lighting, ventilation system, displays, lighting lamps, boilers and other systems



中国通号所属企业“双碳”行动（部分）

CRSC's Subsidiaries "Carbon Peak & Carbon Neutrality" Action (Partial)

西安工业集团 (Xi'an) Industry Group

组织各企业完成碳核查和摸底，形成《西安工业集团关于推动企业碳中和工作的举措和建议》，所属西信公司与高校科研单位合作推动新能源辅助生产用电项目，根据企业生产任务，合理调整用电时间段，实现削峰平谷，通过动态监控电力负荷及时调整新能源用电申请计划，提高电力资源利用效率，减少碳排放。

The company organized its subsidiaries to complete carbon verification and thorough investigation, and formed the "Measures and Suggestions on Promoting Enterprise Carbon Neutralization". The affiliated Xixin Company cooperated with universities and scientific research units to promote new energy auxiliary production electricity project. According to the production tasks, the company adjusted the time period of electricity consumption to realize peak-shaving and valley-filling. By timely adjusting the new energy power consumption plan through dynamic monitoring electricity load, it improved the efficiency of power use, and reduced carbon emissions.

研究设计院集团北信公司 Beixin Company of Research & Design Institute Group

积极开展碳核查及履约工作，2021 年 6 月完成碳核查第三方核查工作，通过对设备设施改造升级降低能源消耗，为公司节约碳排放量，截至 2021 年底，公司账户碳余额 8,955 吨，市场价值约 70 余万元。

The company actively carried out carbon verification and compliance work, completed the third-party carbon verification in June 2021. It reduced energy consumption by upgrading equipment and facilities. By the end of 2021, the carbon balance of the company's account is 8,955 tons, with a market value of about more than 700,000 yuan.

通号工程局集团 Engineering Group

所属建设公司、城建公司，结合工程项目施工，加大对节能降碳环保科研项目攻关力度，开展“一种减少二次结构材料用砖损耗率在楚雄创业园项目技术研究”“地下空间支护及止水绿色施工技术应用研究”“回收型填充墙砌块的研究”等五项科研项目攻关，改进了工艺、降低了成本，提高了工程质量，减少了建筑垃圾的排放，加大回收力度，推动绿色建造。

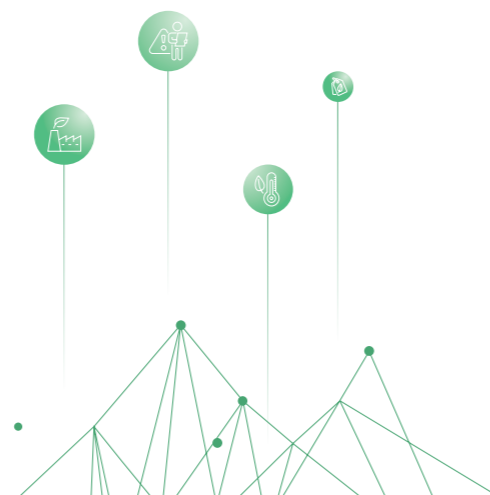
Combining with the construction of the project, its affiliated Construction Company and Urban Construction Company have increased the research on energy saving and carbon reduction, and carried out 5 scientific research projects, including "A technology on reducing the loss rate of bricks used for secondary structural materials in Chuxiong E-Commerce Pioneer Park" "Research on the application of underground space support and water-stop green construction technology" "Research on recycled infill wall blocks". These projects have improved process and technology, reduced costs and discharge of construction waste, increased recycling efforts and promoted green construction.

通号建设集团 Construction Group

多措并举加强施工现场节能管理。一是优先使用国家、行业推荐的节能施工设备和机具；二是优化施工组织，根据工程量大小合理选用机械设备类型，减少机械配置，节约机械能源消耗；三是强化空调、采暖、照明等耗能设备的使用管理，使用 LED 节能灯、太阳能路灯；四是加强公车使用管理，科学核定单车油耗定额。

The company took multiple measures to strengthen energy conservation management on construction sites: first, it firstly used energy-saving equipment and implements recommended by the state and industry; second, it required the construction organizations to select mechanical equipment according to the size of the project, and reduced mechanical configuration, to save mechanical energy consumption; third, it strengthened the use of energy-consuming equipment such as air conditioning, heating, and lighting, and used LED energy-saving lamps and solar street lamps; fourth, it strengthened the use of company's vehicles, and scientifically verified the fuel consumption quota of each vehicle.

减少“三废”排放 Reducing Emissions of "Three Wastes"



中国通号严格遵守《中华人民共和国大气污染防治法》《中华人民共和国水污染防治法》《中华人民共和国固体废物污染环境防治法》等相关法律法规，管控“三废”排放。积极推广减排技术，改良工艺设备，促进从源头消减污染物排放。以减量化、再利用、资源化为重点，探索推动公司着力构建资源循环型产业体系，努力推动产业园循环式生产、产业循环式组合，促进废物综合利用、能量梯级利用、余热余压余能利用、水资源循环使用。

CRSC has strictly complied with relevant laws and regulations such as the Law of the "People's Republic of China on the Prevention and Control of Atmospheric Pollution" "People's Republic of China on Water Pollution Prevention and Control" and the "People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste" to control the emissions of "Three Wastes". Besides, it actively promoted emission reduction technologies, improved process equipment, and promoted the reduction of pollutant emissions from the source. Focusing on quantity reduction, re-utilization and resource recovery, CRSC explored and promoted the subsidiaries to build a resource recycling industrial system, strive to promote recycling production in industrial park throughout the industry. All the measures are aimed to promote comprehensive utilization of waste, energy cascading, reuse of waste heat and the recycling of water resources.

废气治理
Waste gas treatment



按照《挥发性有机物无组织排放控制标准》的要求，对生产过程中挥发有机物进行治理，加强监控管理，加装 VOCs 等废气收集处置装置，确保挥发性有机物达标排放。

In accordance with the requirements of the "Control Standards for Fugitive Emissions of Volatile Organic Compounds", CRSC effectively treated the volatile organic compounds in the production process, strengthened the monitoring and management of operations, and installed waste gas collection and disposal devices such as VOCs to ensure that volatile organic compounds are discharged up to standard.

废水治理
Waste water treatment



生产及生活废水排放方式以循环利用为主，经设备处理达标后统一排放，并按照要求进行水质污染物自行监测与第三方抽检。

For recycling purpose, industrial and domestic wastewater is uniformly discharged after being processed into standard wastewater by dedicated devices, and self-inspection and third-party spot inspection will be conducted on water quality pollutants in accordance with relevant requirements.

固体废弃物
Waste solid treatment



定期收集并规范处理办公垃圾、建筑垃圾、包装材料等一般废弃物；分区存放，并由有资质的第三方处理危险废弃物；开展全员宣传教育，推行垃圾分类。

The disposal of office waste, construction waste, packaging materials and other wastes are regularly collected and processed. All the disposal and waste are sorted and stored by areas. Its processing is audited by qualified third party. The Company also carried out publicity and education for all staff and promoted garbage classification.

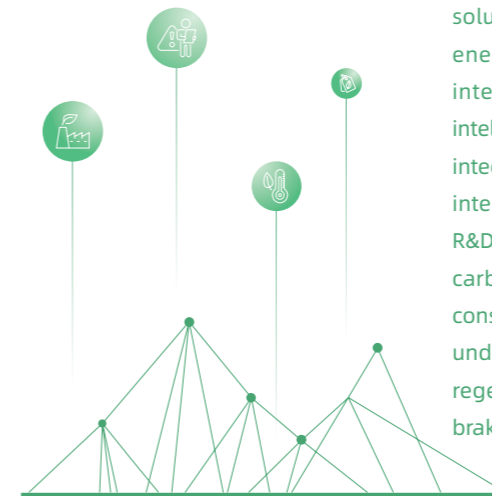
提供绿色解决方案 Providing Green Solutions

作为全球领先的轨道交通控制系统提供商，中国通号将绿色低碳理念融入产品设计、研发、生产、应用全过程，发挥轨道交通核心技术优势，通过优化工艺技术、开发节能高效产品，引导轨道交通装备行业向绿色、智能方向发展。

中国通号不断实践，努力提供绿色出行解决方案，在能源分级利用、工业园区改造升级、信息化监控智能管理、在线仿真控制技术、绿色建筑智能楼宇等方面不断进行技术优化，推出海绵城市、地下综合管理综合监控与报警系统、智慧建筑综合应用系统等一系列成果。所属设计、研发、系统集成企业将绿色低碳发展理念融入业务的各环节中，努力加快绿色低碳轨道交通运输体系建设。研发铁路能量转移装置、铁路能耗再生利用装置、城轨再生制动能量吸收综合利用装置等产品。

As the world's leading provider of rail transit control systems, CRSC integrates green and low-carbon concepts into the entire process of product design, R&D, production, and application, and leverages the core technological advantages of rail transit, and guided the industry to develop in a green and intelligent direction by optimizing process technology and developing energy-saving and efficient products.

CRSC has continued to practice and strive to provide green transportation solutions. It has continuously optimized technologies in many areas, such as energy classification and utilization, industrial park upgrading, monitoring intelligent management, online simulation of control technology, green & intelligent building, and launched a series of achievements, such as pongee city, integrated underground management integrated monitoring and alarm system, intelligent building integrated application system. The subsidiaries in design, R&D, and system integration have integrated the concept of green and low-carbon development into all aspects of business, and strived to accelerate the construction of a green and low-carbon rail transportation system. The products under R&D include railway energy transfer device, railway energy consumption regeneration device, energy absorption and utilization system of regenerative braking in rail transit.



中国通号 2019-2021 年度一般废弃物排放情况 General Waste Discharge of CRSC in 2019-2021

一般废弃物 类型 General waste type	生产制造 Wastes from manufacture					工程建设 Wastes from construction		办公场所 Wastes from office				
	木材 Wood	塑料 Plastic	金属 Metal	纸箱 Carton	其他 Others	建筑垃圾处理量 Construction waste disposal volume	废纸 Waste paper	废旧灯管 Waste lamp	电子垃圾 Electronic waste	硒鼓等打印耗材 Toner cartridges and other printing consumables	灯泡 Bulb	
	吨 ton	吨 ton	吨 ton	吨 ton	吨 ton	吨 ton	千克 kg	根 piece	台 set	个 piece	个 piece	
2019	118.8	344.1	1,425.1	72.5	138.5	51,528.9	24,054.7	3,166	1,146	7,325	1,046	
2020	107.2	330.7	1,355.9	99.0	133.5	6,040.6	49,292.5	6,660	617	5,113	889	
2021	104.5	320.3	692.9	100.7	133.2	28,753.3 ⁴	35,405.6	2,867	1,109	4,834	1,366	

注 4：该数据增大原因同 P71 注 1。

Note 4: The reason for the increase of this data is the same as P71 note 1.

中国通号 2019-2021 年度排放物情况 CRSC Emissions in 2019-2021

排放物类别 Emission type	2019	2020	2021
二氧化硫 (吨) Sulphur dioxide (ton)	0.02	0.016	0.023
氮氧化物 (吨) Nitrogen oxides (ton)	1.0	0.749	0.833
化学需氧量 ⁵ (吨) Chemical oxygen demand (ton)	12.2	8.8	6.8
氨氮 (吨) Ammonia nitrogen (ton)	0.6	0.26	0.66
有害废弃物 (吨) Hazardous waste (ton)	168.5	154.6	173.7

注 5：该指标数据变化原因同 P71 注 2。

Note 5: The reason for the change of this index data is the same as P71 note 2.

以人为本 增进员工福祉

Staying People- Oriented to Improve Employee Well-Being

员工是企业发展的源泉和动力。中国通号坚持“开放引进、精英集聚”的人才战略，保障员工合法权益，助推员工职业成长，关心关爱员工生活，不断提升员工幸福感、获得感，增强企业凝聚力、向心力。

Employees are the source and driving force of enterprise development. CRSC adheres to the talent strategy of "stay open-minded to attract all elites", protects the legitimate rights and interests of employees, promotes their career growth, cares for their lives, continuously improves employees' sense of happiness and gain, and enhances corporate cohesion and centripetal force.

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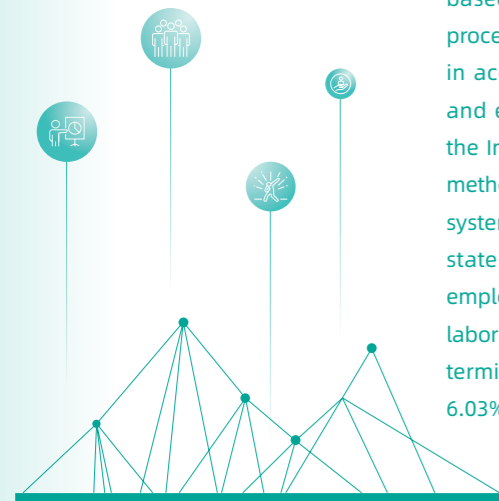
90 做实人文关怀
Practicing Humanistic Care



优化员工结构 Optimizing Staff Mix

中国通号不断规范招聘管理工作，优化人才队伍结构，结合企业实际，制定《中国铁路通信信号股份有限公司招聘管理制度》，规范招聘流程管理。公司严格遵守招聘工作纪律，按照相关招聘规定和程序操作，择优录取，确保招聘工作公开、公平。同时，通过互联网、招聘会、内部公开招聘、员工内部推荐等方式开展招聘，构建多元化招聘渠道，体系化进行人才储备，发挥国资央企稳岗扩就业示范带动作用。2021 年，公司员工总数 20,728 人，劳动合同签订率 100%，社会保险覆盖率 100%。全年流失员工 1,249 人，流失率为 6.03%。

CRSC constantly regulates the recruitment management, optimizes the structure of the talent team, and formulates the Recruitment Management System of CRSC based on the actual situation of the company to standardize the recruitment process. CRSC continued to strictly abide by the recruitment discipline, operates in accordance with the relevant regulations and procedures, selects the best and ensures that the recruitment is open and fair. At the same time, through the Internet, job fairs, internal recruitment, internal recommendation and other methods, CRSC carries out recruitment and built diversified recruitment channels, systematically carry out talent reserves, and give full play to the leading role of state-owned assets and central enterprises in stabilizing jobs and expanding employment. By the end of 2021, CRSC has a total of 20,728 employees with 100% labor contract signing rate and 100% social security coverage rate. 1,249 employees terminated the employment contract, whole year, and the staff turnover rate is 6.03%.



2021 年

公司员工总数	劳动合同签订率	社会保险覆盖率
20,728 人	100%	100%

In 2021, CRSC has a total of **20,728** employees with **100%** labor contract signing rate and **100%** social security coverage rate

中国通号 2021 年度员工构成情况 Staff composition of CRSC in 2021

	类别 Category	员工人数 (人) Number of employees (person)
按员工类型划分雇佣人员总数 By employee type	劳动合同员工 Under employment contract	20,728
	劳务协议员工 Under labor agreement	61
	第三方派遣员工 (含劳务派遣和股东方派遣) Dispatched by third parties (including labor dispatching and shareholder dispatching)	1,206
按年龄结构划分的员工数量 By age	≥ 55 岁 ≥55 years old	1,227
	51-54 岁 51-54 years old	1,253
	41-50 岁 41-50 years old	3,880
	31-40 岁 31-40 years old	8,067
	≤ 30 岁 ≤30 years old	6,301
按层级划分的员工数量 By employee level	高级管理人员 Senior management	259
	中层管理人员 Middle-level management	1,158
	普通员工 Ordinary employees	19,311
按性别划分的员工数量 By gender	男 Male	15,688
	女 Female	5,040
按地区划分的员工数量 By region	中国内陆 China Mainland	20,624
	港澳台 Hong Kong, Macao and Taiwan	1
	国外 Overseas	103

维护基本权益

Safeguarding Staff's Rights and Interests



中国通号严格遵守《工会法》《劳动法》《劳动合同法》《劳动争议调解仲裁法》《职业病防治法》《企业民主管理规定》等涉及职工切身利益的法律法规，严禁童工雇佣和强制劳动等违规行为，切实保护员工合法权益。尊重不同国家、不同种族、不同性别的员工，加强运营地本地人员雇佣，充分发挥本地人才优势。

CRSC strictly abides by the "Labor Union Law" "Labor Law" "Labor Contract Law" "Labor Dispute Mediation and Arbitration Law" "Occupational Disease Prevention Law" "Regulations on Democratic Management of Enterprises" and other laws and regulations involving the vital interests of employees. Violations such as child labor and forced labor are strictly prohibited to effectively protect the legitimate rights and interests of employees. Respect employees of different countries, races, and genders, strengthen the employment of local personnel in the operating locations, and give full play to the advantages of local talents.

薪酬福利

Remuneration and Benefits

中国通号建立健全按业绩贡献决定薪酬的分配机制，以岗位价值为依据，以业绩为导向确定不同岗位工资水平，加快推进薪酬差异化，突出岗位价值、绩效贡献，进一步深化薪酬分配制度改革，建立健全科学合理、客观公平的薪酬体系。制定《中国铁路通信信号股份有限公司员工考勤与休假管理暂行办法》等制度，严格执行各项员工保障制度，按时足额缴纳社会保险，保障员工休息休假权利，提升员工幸福感，增强企业凝聚力。

CRSC has established and improved a salary mechanism based on performance, determined salary levels based on job value and performance, promoted salary differentiation. All these measures highlight job value and performance, further deepen the reform of salary distribution system for a scientific, reasonable, objective and fair remuneration system. CRSC formulated the "Interim Measures for the Administration of Attendance and Vacation of CRSC" and other measures, strictly implemented various employee right-protection systems, paid social insurance in full and on time, guaranteed employees' right to rest and vacation, all of which greatly improves employees' sense of happiness and enhances corporate cohesion.

民主管理

Democratic Management

中国通号持续深化民主管理，加强民主沟通，建立健全以职工代表大会为基本形式的企业民主管理制度，完成对研究设计院集团等 11 家企业职代会申请审核批复，加强职代会指导，规范职代会召开，确保涉及职工切身利益的重要事项必须提交职代会审议。推动完善集体协商，协助各企业普遍建立了集体合同及集体协商制度，指导签订《集体合同》《工资专项协议》，维护职工必需的合法权益利益。

持续开展群众性劳动保护监督，深化职工安全教育、安全培训制度和保护措施落实，推进安全生产隐患排查报告制度落地，强化职工群众在安全风险防控和安全文化建设中的主体作用发挥。

CRSC continued to deepen democratic management, strengthen democratic communication, establish and improve the democratic management system with the workers' congress as the basic form. In 2021, it completed the examination and approval of the workers' congress of 11 enterprises including the CRSC Research & Design Institute Group, and strengthened the guidance of the workers' representative meeting, which standardizes the convening of the workers' congress to ensure that important matters involving the vital interests of employees can be submitted for deliberation. CRSC also promoted the collective negotiation system, assisted enterprises to generally establish collective contracts and negotiation systems, ensuring the signing of Collective Contracts and Special Wage Agreements and safeguarding the legitimate rights and interests of employees.

By carrying out mass labor protection supervision, CRSC continued to implement employee safety education and training system and improve hidden danger reporting system, strengthening the main role of employees in the prevention and control of safety risks and the construction of safety culture.



开展劳模先进评选 Carrying out Selection of Advanced Workers

中国通号大力弘扬劳模精神、劳动精神、工匠精神，宣传先进、推广先进，为劳模工匠发挥更大作用营造成长环境，在全系统积极营造崇尚先进的氛围。研究设计院集团北信公司手工焊接班获得“全国工人先锋号”“火车头奖杯”“全路巾帼标兵岗”“全国铁路先进女职工集体”等称号；西安工业集团津信公司要海龙等 3 人获得“火车头奖章”称号，研究设计院集团列车运行控制系统基石攻关团队等 2 个集体获得“火车头奖杯”称号；西安工业集团沈信公司电器中心调整三班获得“全国五一巾帼标兵岗”“全国三八红旗集体”称号；通号工程局集团天津装备技术有限公司高铁地铁配线班组获得“全国巾帼文明岗”称号；研究设计院集团张璐获得“全国铁路先进女职工”称号；上海工程局集团阚纯荣获得“全国铁路先进女职工工作者”称号；研究设计院基础院院长刘贞获得 2021 年度“新时代·铁路榜样”提名奖。

CRSC vigorously promotes the mindset to follow the model workers, labor, and craftsmanship, publicizes the advanced, creates more growth opportunities for model workers and craftsmen, and actively creates an atmosphere advocating advanced in the whole system. The manual welding team of Beixin Company of Research & Design Institute Group won the titles of "National Worker Pioneer" "Locomotive Trophy" "Women's Model Post" "National Railway Advanced Female Worker Collective" and so on. Yao Hailong and other two employees from Jinxin Company of (Xi'an) Industry Group won the title of "Locomotive Medal". Two collectives from Research & Design Institute Group won "Locomotive Trophy". The Class 3 of electrical center from Shenxin Company of (Xi'an) Industry Group won the title of "National May 1st Women's Model Post" and "National March 8 Red Flag Collective". The high-speed rail and subway wiring team of Tianjin Equipment Technology Co., Ltd. of Engineering Group won the title of "National Women's Civilization Post". Zhang Lu, the employee of Research & Design Institute Group won the title of "National Railway Advanced Female Worker". Kan Chunrong of Shanghai Engineering Group won the title of "National Railway Advanced Female Worker". Liu Zhen, Dean of the Institute of the Primary Research and Design Institute, was nominated as the 2021 "Railway Model in New Era".



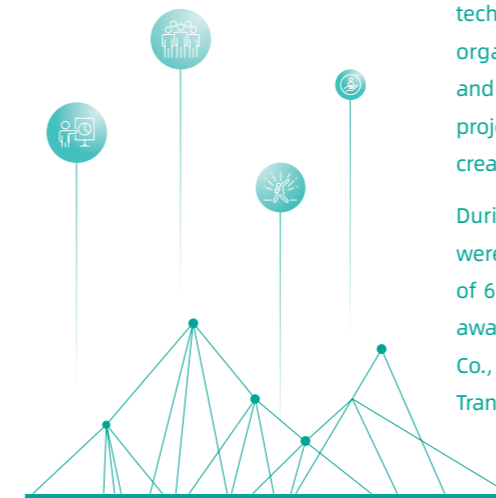
打造劳模品牌 Building a Model Worker Brand

中国通号持续深化劳模先进创新创效活动，打造“劳模创新”品牌。全系统共有劳模创新工作室 27 个，开展职工技术创新、合理化建议活动，组织成果评比交流，推动创新成果转化应用。共开展创新攻关项目 103 项、创新成果 72 项、获得实用新型专利 83 项，创造经济价值 1 亿余元。

年内对 14 个股份公司级“劳模创新工作室”2018 年以来研发的创新成果进行评比，共评出一等奖 6 项、二等奖 9 项、三等奖 12 项、优秀奖 11 项。上海工程局集团“刘伟斌创新工作室”被评为上海市建设交通系统“组织生活开放点”。

CRSC continued to make full use of model worker in innovation and benefit-creation, and built the brand of "Model Worker Innovation". There are 27 model worker innovation studios throughout the whole group, which carried out technical innovation and suggestion proposal activities. Besides, the studios also organized achievement evaluation and exchange to promote the transformation and application of innovation achievements. In 2021, a total of 103 key innovation projects, 72 innovation achievements, and 83 utility model patents were obtained, creating an economic value of more than 100 million yuan.

During the year, 14 joint-stock company-level "model worker innovation studios" were evaluated for the innovation achievements developed since 2018, and a total of 6 first prizes, 9 second prizes, 12 third prizes and 11 excellence awards were awarded. The "Liu Weibin Innovation Studio" of CRSC Shanghai Engineering Group Co., Ltd. was rated as "Demonstration of Organization" in Shanghai Construction & Transportation Branch.



2021 年	共开展创新攻关项目	创新成果	获得实用新型专利	创造经济价值
	103 项	72 项	83 项	1 亿余元
	In 2021, a total of 103 key innovation projects, 72 innovation achievements, and 83 utility model patents were obtained, creating an economic value of more than 100 million yuan			

推动职业发展 Promoting Career Development



中国通号十分注重员工的职业发展，为员工搭建职业发展平台，畅通职业发展通道，构建和完善培训体系，助力员工快速成长，实现“人尽其才”。

CRSC attaches great importance to the career development of employees, builds a career development platform, unblocks career development channels, builds and improves the training system, helps employees grow rapidly, and realizes "the best use of talents".

畅通职业通道 Unlocking Career Path

中国通号不断释放和激发员工创新创业活力，印发《中国铁路通信信号集团有限公司优秀年轻干部选拔培养办法》《中国铁路通信信号股份有限公司贯通高技能人才与专业技术人才职业发展通道管理办法》等制度，畅通优秀年轻干部、高技能人才与专业技术人才等的发展通道，调动员工发展积极性。

RSC has continuously released and stimulated the vitality of innovation and entrepreneurship of employees, and issued the "Measures for the Selection and Training of Outstanding Young Cadres of CRSC" and the "Management Measures for the Career Development Channel of CRSC" to smooth the development channels of Outstanding young cadres, high-skilled talents and professional technical talents, and mobilize the enthusiasm of employees for development.



开展员工培训 Conducting Employee Training

中国通号确立人才优先发展的战略导向，以培训与工作结合、讲求实效为原则，坚持内部培训为主、外部培训为辅，指定培训计划为主、临时培训为辅，团队培训为主、个体培训为辅，构建管理与业务培训兼顾、按照岗位设置的差异性培训模式，助力员工职业发展。

CRSC has established a strategic orientation of giving priority to the development of talents. Based on the principle of combining training with work and focusing on practical results, CRSC adheres to the principle of "internal training, supplemented by external training", "designated training, supplemented by temporary training", "team training, supplemented by individual training". A differentiated training model that takes into account management and business training has been set up according to positions to help employees develop their careers.



落实《中国铁路通信信号集团有限公司优秀年轻干部选拔培养办法》，抓好优秀年轻干部专业能力建设，注重加强前沿科技知识和全球科技发展趋势学习，突出科学精神、科学思想培养。

CRSC implemented the "Measures for the Selection and Training of Outstanding Young Cadres of CRSC", paid special attention to the outstanding young professionals. Focusing on strengthening the learning of cutting-edge scientific and technological knowledge and global scientific and technological development trends, the Group made an effort to cultivate the scientific thinking of young professionals.

针对涵盖生产、施工、设计、科研、技术开发和技术管理等岗位的工程技术人员，制定《中国铁路通信信号股份有限公司工程系列专业技术职务评聘管理办法》，充分发挥工程技术人员的积极性、创造性。

For the engineering and technical personnel covering production, construction, design, scientific research, technology development and technical management, etc., CRSC formulated the "Evaluation and Employment Measures for Professional and Technical Position of CRSC" to give full play to engineering and technical personnel to stimulate their creativity.

制定《中国铁路通信信号股份有限公司科技人才评价管理办法》《中国铁路通信信号股份有限公司科技专家考核管理办法》，积极加快相关领域的领军人才培养，并制定院士候选人培养计划及年度重点工作计划，确保院士候选人培养工作按照计划实施。

CRSC formulated the "Management Measures for the Evaluation of Scientific and Technological Talents of CRSC" and the "Measures for the Evaluation of Scientific and Technological Experts of CRSC", actively accelerating the training of leading talents in related fields. It also formulated the training plan for academician candidates and annual plan to ensure that the training of academician candidates is implemented according to the plan.

中国通号 2019-2021 年度员工培训绩效 CRSC's Employee Training in 2019 to 2021

类别 Category	员工培训百分比 (%) Percentage of staff trained (%)			人均培训时长 (小时) Average training time (hours)			
	2019	2020	2021	2019	2020	2021	
按性别划分的员工 培训情况 By gender	男 Male	86.0	85.3	86.37	39.3	29.6	35.06
	女 Female	85.0	81.7	80.65	36.9	26.9	28.57
按雇员层级划分的 员工培训情况 By employee level	高级管理层 Senior management	100	100	100	38.1	73.8	108.14
	中级管理层 Middle-level management	80.0	100	90.16	45.7	35.4	57.95
	基层员工 Entry level employee	86.0	81.7	84.93	38.0	27.3	31.23

做实人文关怀 Practicing Humanistic Care



中国通号重视人文关怀，通过保障员工职业健康与安全，开展丰富多彩的文体活动，关怀帮扶困难员工，助力员工快乐工作、健康生活，努力营造和谐向上的文化氛围。

CRSC attaches great importance to humanistic care, and strives to create a harmonious and progressive cultural atmosphere by safeguarding the occupational health and safety of employees, carrying out a variety of cultural and sports activities, caring and helping employees in difficulty, helping employees to work happily and live a healthy life.

保障职业健康 Safeguarding Occupational Health

中国通号遵循“安全第一、预防为主、劳动保护人人有责、以人为本、全年保护”的原则，落实劳动保护职责，推进消除和预防劳动生产过程中可能发生的伤亡、职业病和急性职业中毒等情况，安全检查部门和负责劳动保护部门按照各自职责检查、督促、落实职责，工会依法代表员工对劳动保护工作实行群众监督。公司通过 OHSAS 18000 职业健康安全管理体系，所属企业根据市场要求均已全部通过。持续关注员工心理健康，帮助员工及时解决心理问题、舒缓精神压力，让员工享受健康优质的工作生活。2021 年，公司因工伤损失工作日数 341 天。2019-2021 年，公司因公亡故人数、发生职业病及职业中毒等事故数均为 0。

CRSC follows the principles of "safety first, prevention first, people-oriented, group-wide labor protection throughout the year" to implement labor protection responsibilities, and to prevent and eliminate casualties, occupational diseases and acute injuries that may occur during labor and production. The safety inspection department and the labor protection department inspect, supervise and implement their duties according to their respective measures, and the labor union supervises the labor protection work by the masses on behalf of the employees in accordance with the law. The company has got the OHSAS 18000 occupational health and safety management system, and its affiliated enterprises have also passed the certification according to market needs. The Company pays attention to the mental health of employees, help employees solve psychological problems in a timely manner, relieve mental stress, and allow employees to enjoy a healthy and high-quality life. In 2021, 341 working days were lost due to work-related injuries. From 2019 to 2021, the number of deaths in work-related injury, occupational diseases and occupational poisoning accidents of CRSC was 0.

帮扶救助员工 Assisting Employees

中国通号持续开展员工帮扶救助工作，推进工会系统建立三级帮扶救助体系，让员工感受到温暖和爱护。2021 年，慰问困难职工 418 人，累计发放慰问金 214.37 万元。上海工程局集团工会等 2 个集体获得“全路困难职工解困脱困工作先进集体”称号；电缆集团郭艳等 3 人获得“全路困难职工解困脱困工作先进个人”称号。

CRSC continued to carry out employee assistance, and established a three-level assistance system throughout the labor union, so that employees can be better cared for. In 2021, 418 employees in difficulties were assisted, and a total of 2.14 million yuan of assisting fund was distributed. 2 collectives including the labor union of Shanghai Engineering Group won the title of "Advanced Collectives for Assisting Practice". 3 individuals including Guo Yan from Cable Group won the title of "Advanced Individuals for Assisting Practice".

2021 年

慰问困难职工

418人

累计发放慰问金

214.37万元

In 2021, **418** employees in difficulties were assisted, and a total of **2.14** million yuan of assisting fund was distributed

关爱女性员工 Caring for Female Employees

中国通号落实《女职工劳动保护实施办法》，关心关爱女性职工，在上海工程局、通号产业园区等 4 处场地新建“女职工爱心屋”，均获得铁路总工会“铁路爱心屋”称号，为女性员工需求提供保障。

CRSC implemented the Measures for the Implementation of Labor Protection for Female Employees, cared for female employees, and built "Female Workers Love House" in 4 sites including CRSC Shanghai Engineering Group and CRSC Industrial Park, all of which were awarded the title of "Railway Love House" by All-China Federation of Railway Workers' Unions, providing protection for the needs of female employees.

关怀一线员工 Caring for Front-Line Workers

中国通号持续深化关心关爱员工，开展一线员工送温暖活动。筹集送温暖资金 502.82 万元，慰问困难职工家庭 738 个，发放慰问物资 78.12 万元，慰问一线职工、劳模先进 10,672 人，一线班组 616 个，发放慰问物资共计 424.7 万元。继续做好送清凉活动，以在线慰问+现场走访等形式关爱基层一线干部职工，送清凉活动安排资金 253.48 万元，慰问工程项目 324 个，慰问一线班组 511 个，慰问人数达到 14,382 人次。

CRSC continued to care for employees, and carried out activities to send warmth to front-line employees. A total of 5.03 million yuan of warm funds was raised. 781,200 yuan of cash and necessities were distributed to 738 families of employees in need. A total of over 4.24 million yuan of materials were distributed to 10,672 front-line workers and advanced workers and 616 front-line teams. CRSC continued to conduct sending coolness in summer, in the form of online activity, on-site visits, etc., to actively care for the grass-roots front-line workers who work under the sunshine in scorching summer. Over 2.53 million yuan of funds for sending coolness was distributed, 324 caring projects were conducted, benefiting 511 front-line teams and 14,382 people.

2021 年
筹集送温暖资金

502.82 万元

慰问困难职工家庭

738 ↑

In 2021, a total of 5.03 million yuan of warm funds was raised, helped 738 families with difficulties



开展“关爱职工 夏送清凉”慰问活动
Carried out the condolence activity of "Caring for Employees and Sending Coolness in Summer"



2021 年 6 月，中国通号举办“大国顶梁柱·永远跟党走——中国通号党委喜迎建党 100 周年红歌赛”

In June 2021, CRSC held red song competition themed "The Pillar of a Great Country, Always Follow the Party - Celebration of the 100th Anniversary of the Party"

丰富文体生活 Enriching Employees' Life with Cultural and Sports Activities

中国通号积极开展丰富多彩的文体活动，平衡员工工作与生活。2021 年，组织开展“中国梦·通号情·劳动美——永远跟党走、奋进新征程”职工演讲比赛以及才艺展示、书画摄影篆刻评比、象棋围棋比赛等活动，打造健康文明、昂扬向上、全员参与的职工文化。中国通号工会获得全国书香三八读书征文活动优秀组织奖，获得全国征文活动二等奖 1 个、三等奖 1 个、优秀奖 6 个。通号工程局集团天津分公司获得 2021 年“全国工会职工书屋示范点”称号。

CRSC actively carries out a variety of cultural and sports activities to balance the work and life of employees. In 2021, the Group organized speech contest themed "Chinese Dream, CRSC Enthusiasm, Beauty of Labor - Always Follow the Party and Forge a New Journey", and other contests of calligraphy, painting, photography and seal cutting, chess and Go and other activities to create a healthy, civilized and high-spirited a staff culture of full participation. The CRSC Labor Union won the Outstanding Organization Award for the National Women's Literature Collection Event, and won 1 second prize, 1 third prize and 6 excellence awards in the National Literature Collection Event. Tianjin Branch of Engineering Group won the title of "National Labor Union Bookstore Demonstration Site" in 2021.

协力同行 打造共赢格局

Working Together to Create a Win-Win Situation

中国通号不断完善融通格局，凭借拥有完全自主知识产权的多项技术，拓宽国际轨道交通建设合作网络，服务“一带一路”倡议，成为中国新的“外交名片”。同时，不断加强产业链、供应链建设，深化与地方政府、企业、学术机构合作，推进融合发展，实现多方共赢。

CRSC has continuously improved the interoperable structure. With a number of independently developed technologies, it has expanded the international rail transit cooperation and made its contribution to the "Belt and Road" Initiative, becoming China's new "diplomatic business card". At the same time, we have continued to strengthen the industrial chain and supply chain, deepen cooperation with local governments, enterprises and academic institutions, and promote integrated development to achieve a win-win situation for all parties.

96 服务“一带一路”
Serving the "Belt and Road"

99 深化战略合作
Deepening Strategic Cooperation

102 筑牢责任供应链
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签约项目：面向线网融合的多制式兼容型信号系统
研究与应用

甲方：长春市轨道交通集团有限公司
乙方：中国通号城市轨道交通技术有限公司



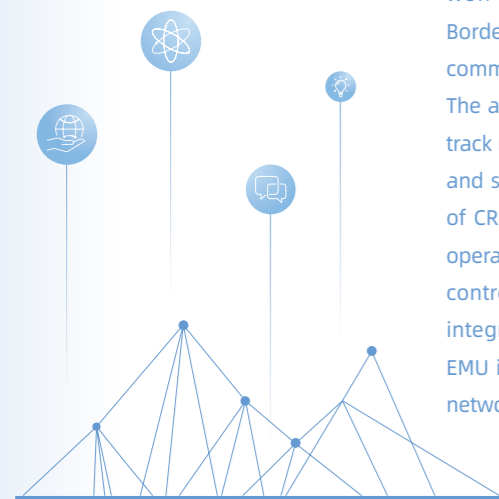
服务“一带一路” Serving the "Belt and Road"

中国通号秉持“携手同行，美美与共”的精神，认真落实“一带一路”倡议，充分发挥长期积累的先进技术和丰富经验，推动中国高铁“走出去”，打造靓丽的“国家名片”。

2021年，中国通号克服疫情影响，稳步推进匈塞铁路贝诺段通信、信号、信息系统工程建设，保障全线采用中国标准的中老铁路全线开通运营，持续高标准推进印尼雅万高铁、匈塞铁路、老挝泰国二期铁路、泰国复线铁路改造等项目的建设任务。成功中标匈塞铁路塞尔维亚境内诺维萨德 - 苏博蒂察 - 边境（克莱比奥）段通信信号工程，包揽匈塞铁路塞尔维亚境内全线通信信号系统工程项目。自主化计算机联锁设备顺利通过泰国铁路局和泰国复线铁路项目业主咨询方专家组现场厂验，成功落地泰国市场。完成中国通号匈牙利实验室第一阶段搭建，建成我国首个在欧盟国家的高铁列车运行控制系统实验室。率先完成欧洲列车运行控制系统相关产品匈牙利质量认证，按计划推进双层动车组车载信号系统在欧洲的集成与认证工作，不断完善国际运营网络。

CRSC adheres to the spirit of "Joining Hands, Sharing Goodwill", earnestly implements the "Belt and Road" initiative, and makes full use of the advanced technology and rich experience to promote China's high-speed rail to "go global" and create a beautiful "national business card".

In 2021, CRSC overcame the impact of the epidemic and steadily push forward the construction of the communication, signal and information system engineering of the Belgrade Center-Novi Sad section of the Hungary-Serbia Railway. The projects such as China-Laos Railway, the Jakarta-Bandung high-speed railway in Indonesia, the Hungary-Serbia Railway, the Laos-Thailand Phase II railway, and the reconstruction of the double-track railway in Thailand are progressing steadily. CRSC successfully won the bid for the communication signal project of the Novi Sad-Subotica-Border (Kelebija) section of the Hungary-Serbia Railway in Serbia, winning the entire communication and signal system project of the Hungary-Serbia Railway in Serbia. The autonomous computer interlocking equipment successfully for the Thai double-track railway project passed the on-site factory inspection of the Thai Railway Bureau, and successfully landed in the Thai market. In 2021, CRSC completed the first phase of CRSC's Hungarian laboratory, and built China's first EU-based high-speed train operation control system laboratory. The products applied to European train operation control system have got the Hungarian quality certification, which promoted the integration and certification of the on-board signal system of the double-decker EMU in Europe as planned, and continuously improved the international operation network.



案例 Case

中国通号率先完成欧洲列车运行控制系统相关产品匈牙利质量认证

CRSC took the lead in completing the Hungarian quality certification of European train operation control system related products

2021年4月，中国通号自主研发的RBC（无线闭塞中心）、LEU（地面电子单元）产品获颁匈牙利DeBo质量证书，这也是我国自主研发的欧洲列车运行控制系统（ETCS）系列产品首次获得欧盟国家本地DeBo认证证书，为高质量推进匈塞铁路匈牙利段项目建设，推动中国高铁技术和产品立足欧洲、走向全球奠定坚实基础。

自2018年首次在欧盟区域内进行铁路信号产品DeBo认证的探索工作以来，中国通号安排多批次技术专家赴匈牙利与认证机构和铁路局开展技术对接工作，双方克服重重困难，厘清认证过程细节和技术要求，加速推进相关产品认证工作。中国通号相关技术团队在欧洲疫情持续反复情况下坚守匈牙利现场第一线，在保障“零感染”的前提下，密切配合国内技术团队，保障匈牙利信号产品DeBo认证工作的出色完成，确保中国高铁装备顺利进入欧盟，为中国高铁“走出去”和“一带一路”倡议贡献通号科技力量。

In April 2021, the RBC (Radio Blocking Center) and LEU (Land Electronic Unit) products independently developed by CRSC were awarded the Hungarian DeBo Quality Certification. This is the first Debo Certification awarded by EU countries to CRSC's ETCS, which has laid a solid foundation for the high-quality construction of the Hungarian section of the Hungary-Serbia Railway, and the promotion of China's high-speed rail technology and products to be based in Europe and go global.

Since the first time to apply for DeBo Certification in the EU region in 2018, CRSC has arranged multiple batches of technical experts to go to Hungary to carry out technical docking work with certification agencies and railway companies. With the help of the cooperators, CRSC has overcome many difficulties and clarified the details and technical requirements of the certification process. CRSC's technical team adhered to the front line of the Hungarian site despite the epidemic in Europe. On the premise of ensuring "Zero Infection", it closely cooperated with the technical team in China to ensure the completion of the DeBo Certification of Hungarian signal products. The efforts ensured that China's high-speed rail equipment successfully entered the EU, contributing CRSC's scientific and technological strength to China's "Going out" Strategy and "Belt and Road" Initiative.



案例 Case 中国通号“三位一体”全产业链助力中老铁路开通运行

CRSC's "Trinity" Whole Industry Chain Helps the Opening and Operation of the China-Laos Railway

2021年12月，全线采用中国标准的中老铁路全线开通运营。中国通号充分发挥研发设计、生产制造、工程施工“三位一体”全产业链优势，全线联动，分工协作，标准化、规范化、精益化推动中国标准的行车调度指挥系统等列车运行控制系统，以及通信、信号、信息、防灾等精品工程建设，为中老铁路全力打造“控制大脑”和“中枢神经”，极大提升了中老铁路的现代化及智能化水平，确保中老铁路的运行更高效、更安全、更稳定。

中老铁路全线正式通车，体现了中国通号先进的铁路通信信号技术与工艺水平，以及积极参与“一带一路”沿线铁路项目建设，构建中老命运共同体的责任与担当。

In December 2021, the China-Laos railway totally adopted Chinese standards has been put into operation. CRSC gave full play to the advantages of the whole industrial chain, mobilized the resource along the chain for R&D, design, manufacturing and construction, and promoted China's train control systems such as train dispatching command system in a standard, regulated and refined method. CRSC also implemented many high-quality projects for communication, signals, information, and disaster prevention. The Group has fully created the "control brain" and "central nervous system" for the China-Laos Railway, which has greatly improved the modernization and intelligence level of the railway, and ensured that its operation is more efficient and effective, safer and more stable.

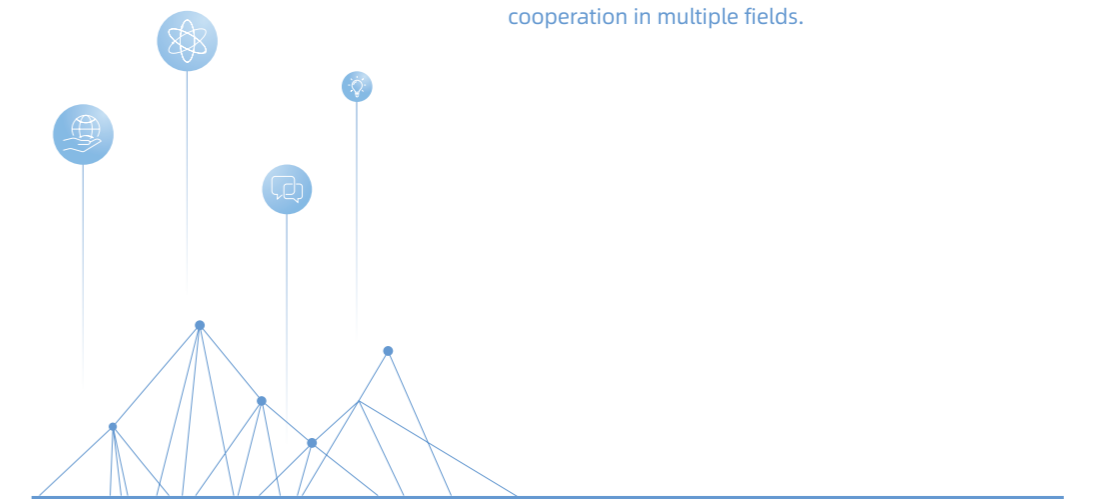
The official opening of the China-Laos railway demonstrates CRSC's advanced railway communication signal technology, as well as its active engagement in the construction of railway projects along the "Belt and Road", and the responsibility to build a China-Laos community with a shared future.



深化战略合作 Deepening Strategic Cooperation

中国通号积极整合优势资源，与政府、企业、科研院所等深入开展战略合作，强化优势互补，促进产学研深度融合，实现价值共赢。2021年，中国通号继续参加进博会，扩展采购交易渠道；深化与北京交通大学、佳讯飞鸿智能科技研究院合作，联合成立轨道交通宽带移动信息通信联合工程试验基地；与三门峡市达成战略合作，同时加强与中国城市轨道交通协会、华东交通大学的沟通交流，促进深化多领域合作。

CRSC has actively integrated advantageous resources, conducted in-depth strategic cooperation with the government, enterprises, scientific research institutions, etc., to promote the deep integration of all aspects, and achieve a win-win situation. In 2021, CRSC participated in the CIIE to expand procurement and transaction channels. It also deepened the cooperation with Beijing Jiaotong University and Jiaxun Feihong Intelligent Technology Research Institute to jointly establish a joint engineering test base for rail transit broadband mobile information communication. In 2021, CRSC also reached a strategic cooperation with Sanmenxia City, and strengthened communication with China Association of Metros and East China Jiaotong University to deepen cooperation in multiple fields.



案例 Case 中国通号参加第四届进博会，与世界共享发展机遇

CRSC participated in the 4th China International Import Expo and shared development opportunities with the world

2021 年 11 月，第四届中国国际进口博览会在上海举行，中国通号交易分团与来自德国、瑞士、奥地利等国的企业就计轴系统、贴片机、无线调制解调器、板卡、中继器、交换机等物资设备进行现场签约，圆满完成各项采购交易任务，签约采购质量再创新高。

中国通号充分把握国内国际双循环经济格局和举办进博会重大机遇，进一步扩大与外方企业的合作领域、规模和水平，持续完善价值链、供应链，推动自主列控技术服务全球轨道交通建设，提升中国通号品牌价值，实现企业高质量发展。

In November 2021, the 4th China International Import Expo was held in Shanghai. The CRSC trading sub-delegation and enterprises from Germany, Switzerland, Austria and other countries signed cooperation agreements for axle counting systems, surface mount system, wireless modems, PC boards, RP repeater, switches and other materials and equipment, successfully completing procurement tasks, and the quality of contracted procurement has reached a new high.

CRSC fully grasped the domestic-international dual circulation pattern and the opportunity of hosting the CIIE, further expanded the field, scale and level of cooperation with foreign companies, which continues to improve the value chain and supply chain, promote independent train control technology to serve global rail transit and enhance the brand value of CRSC.

案例 Case 中国通号与三门峡市签署全面战略合作框架协议

CRSC signed a comprehensive strategic cooperation framework agreement with Sanmenxia City

2021 年 11 月，中国通号与三门峡市政府签署全面战略合作框架协议，双方将强化央地共建，整合优势资源，发挥三门峡市优越地理位置、丰富属地化资源和优渥营商环境优势，协同中国通号良好产业基础、雄厚技术实力和科研创新能力优势，围绕智慧城市建设、联合创新实验室共建、应用产品推广、高铁装备制造、绿色交通体系建设等方面深化合作。

In November 2021, CRSC signed a comprehensive strategic cooperation framework agreement with the Sanmenxia Municipal Government. The two parties were to strengthen the joint construction of the SOEs and local governments, integrate advantageous resources, and give full play to the advantages of Sanmenxia City's geographical location, rich localized resources and favorable business environment. Relying on the sound industrial foundation, strong technical strength and R&D capabilities, the two parties would deepen cooperation in areas such as smart city, joint innovation laboratory, product promotion, high-speed rail equipment manufacturing, and green transportation system.

案例 Case 中国通号牵头成立轨道交通宽带移动信息通信联合工程试验基地

CRSC led the establishment of a joint engineering test base for rail transit broadband mobile information communication



2021 年 5 月，中国通号旗下通号工程局集团与北京交通大学、佳讯飞鸿智能科技研究院联合成立的轨道交通宽带移动信息通信联合工程试验基地在北京交通大学正式挂牌成立。三方主要面向轨道交通智能建造领域，重点围绕宽带移动信息通信技术工程化应用开展研究和创新，实现铁路 5G、物联网、数字孪生等新技术在系统仿真、工程应用研发、测试实验、工程试验、数据资源共享、技术攻关与成果转化等方面的优势集成与互补，联合打造国际领先、行业一流的轨道交通通信信号智能建造试验基地，共同推动轨道交通技术的升级发展。

In May 2021, the Rail Transit Broadband Mobile Information Communication Test Base jointly established by CRSC Engineering Group, Beijing Jiaotong University and Jiaxun Feihong Intelligent Technology Research Institute was officially inaugurated in Beijing Jiaotong University. The three parties mainly focus on the field of rail transit intelligent construction, focusing on research and innovation around the engineering application of broadband mobile information and communication technology. The test base aims to realize the application of new technologies such as railway 5G, Internet of Things, and digital twins in system simulation, engineering application, experiments, which would enhance the integration of the advantages of the innovation. The three parties will make efforts to make the test base world-leading for rail transit communication signals, and to jointly promote the upgrading and development of rail transit technology.



筑牢责任供应链

Building a Responsible Supply Chain

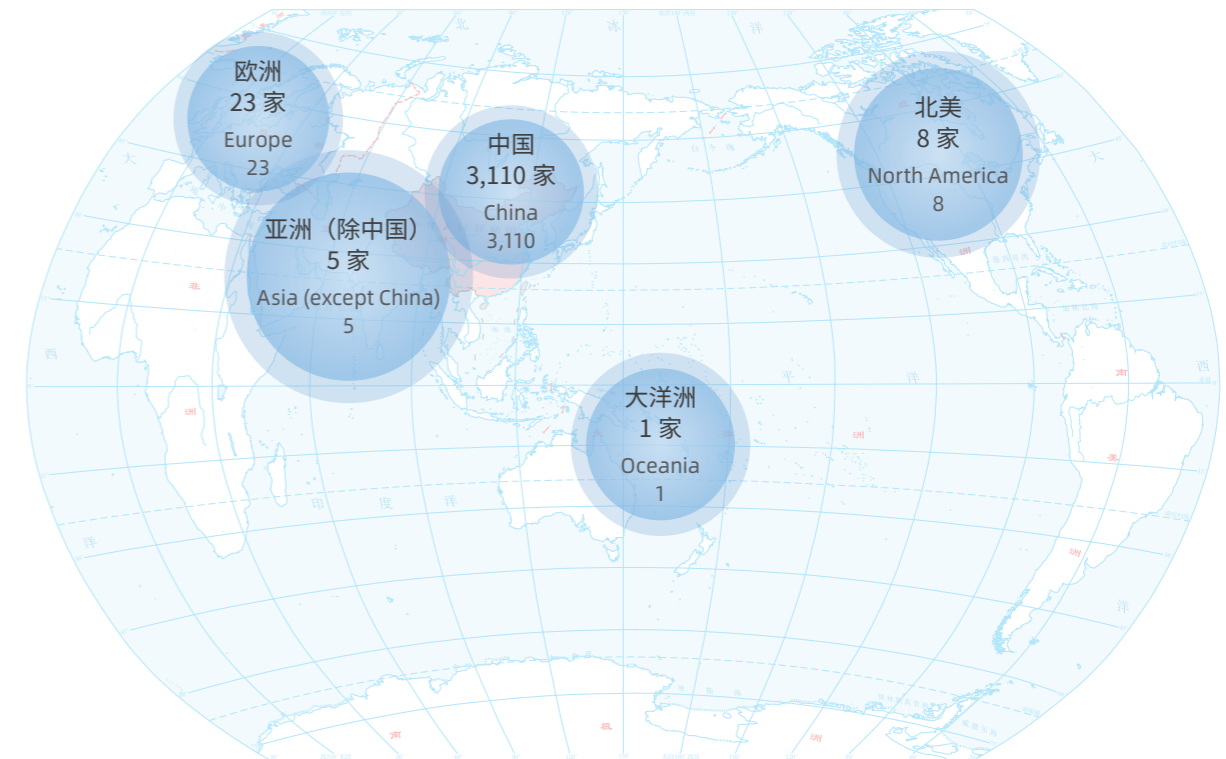


中国通号积极推进责任供应链建设，通过制定供应商管理办法、采购管理办法等相关制度与考核机制，健全供应链管理体系，规范采购管理，加强供应商准入、考评工作，助力供应商成长，构建诚信透明的责任供应链。同时，积极推行绿色采购、绿色包装及绿色运输理念，向供应商传递绿色环保和可持续发展的价值观。

CRSC has actively promoted the construction of a responsible supply chain. By formulating relevant systems and assessment mechanisms such as supplier management methods and procurement management methods, it has improved the supply chain management system, standardized procurement management, strengthened supplier evaluation, which helped to build an honest and transparent responsible supply chain. At the same time, CRSC actively promoted the concepts of green procurement, green packaging and green transportation, and conveyed the values of green environmental protection and sustainable development to suppliers.

中国通号 2021 年供应商分布

CRSC Supplier Distribution in 2021



○ 阳光采购 Sunshine procurement

持续规范采购管理，坚持合法依规的阳光采购，针对不同采购方式制定依法合规采购程序，从采购计划、采购执行、过程监管等方面进行全方位约束，确保采购过程公平公正。

Continue to standardize procurement management, adhere to legal and compliant sunshine procurement, formulate legal and compliant procurement procedures for different procurement methods, and carry out all-round constraints from procurement planning, procurement execution, process supervision, etc., to ensure that the procurement process is fair and just.

○ 供应商准入 Supplier access

在供应商商业信誉、财会制度、专业技术、生产供应能力等方面，严格把控供应商资格审查，鼓励有实力的供应商参与采购，严禁不符合程序和规定要求的企业进入合格供应商名录。

In terms of supplier business reputation, accounting system, professional technology, production and supply capacity, etc., CRSC strictly controls supplier qualification review, encourages powerful suppliers to participate in procurement, and strictly prohibits enterprises that do not meet the requirements of procedures and regulations from entering the list of qualified suppliers.

○ 供应商质量评估 Supplier quality assessment

实施关键及重要供应商年度审查，监督检查供应商技术工艺、生产作业过程质量等内容，强化供应商产品质量安全风险考核。

Implement annual review of key and important suppliers, supervise and inspect suppliers' technical processes, production process quality, etc., and strengthen supplier product quality and safety risk assessment.

○ 供应商信用评价 Supplier credit evaluation

开展供应商信用等级评价，对信用等级不合格的供应商两年内不再受理其供应商准入申请、不得参与采购活动。供应商存在偷工减料、以次充好、供应假冒伪劣产品，或者给企业生产经营和项目建设带来严重负面影响等任一情形的，实行“一票否决”。2021年，年度信用评价涉及供应商3,779家，公司共通报39家供应商不良行为，其中：潜在不良行为28家，一般不良行为4家，较大不良行为6家，重大不良行为1家，均给予处分。

Carry out supplier credit evaluation, and no longer accept applications for supplier access or participate in procurement activities for suppliers that fail to pass the credit evaluation within two years. If a supplier cuts corners, uses shoddy products, supplies fake and shoddy products, or has a serious negative impact on the production and operation of the enterprise and project construction, a "one-vote veto" shall be implemented. In 2021, the annual credit evaluation involved 3,779 suppliers, and the Company notified and dealt with a total of 39 suppliers of bad behaviors, including: 28 potential bad behaviors, 4 general bad behaviors, 6 bad behaviors, and 1 major bad behavior.

○ 供应商成长 Supplier growth

建立责任供应链激励机制，定期举办供应商大会、供方质量沟通会，用心倾听供应商的困惑与诉求，为供应商提供专业指导和支持，助力提高产品和服务质量，改善自身经营管理。

Establish an incentive mechanism for responsible supply chain, regularly hold supplier conferences and supplier quality communication meetings, listen carefully to suppliers' concern and demands, provide suppliers with professional guidance and support, help improve product and service quality, and improve their own management.

情系社会 共享美好生活

Serving the Community to Share a Better Life

中国通号积极响应国家号召，在实现经济效益的同时，积极履行社会责任，多措并举做好精准扶贫与乡村振兴有效衔接，助力共同富裕；全力支持抗击新冠肺炎疫情，守护人民生命安全和健康；积极开展社会公益活动，传播“奉献、友爱、互助、进步”的志愿服务精神，为构建和谐社会、增添民生福祉贡献力量。

CRSC actively responded to the call of the state, actively fulfilled its social responsibilities while achieving economic benefits, and took multiple measures to effectively connect targeted poverty alleviation and rural revitalization to help common prosperity. CRSC fully supported the fight against the Covid-19 epidemic and protected the safety and health of the people. By carrying out social welfare activities, it spread the volunteer spirit of "dedication, fraternity, mutual assistance and progress", contributing to building a harmonious society and increasing people's livelihood and well-being.

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Revitalizing Rural Area

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接续乡村振兴 Revitalizing Rural Area

2021 年
投入乡村振兴帮扶资金

543.52 万元

累计投入无偿帮扶资金

2,056.52 万元

In 2021, CRSC invested **5.44** million yuan in rural revitalization and assistance funds, and a total of **20.57** million yuan in non-reimbursable assistance fund

2021 年 2 月 25 日，习近平总书记在全国脱贫攻坚总结表彰大会庄严宣告，我国脱贫攻坚战取得了全面胜利。作为中央企业，中国通号积极贯彻落实习近平总书记关于实施乡村振兴战略的重要指示精神，持续巩固提升脱贫攻坚成果，推进同乡村振兴有效衔接。

中国通号贯彻落实《关于坚持做好中央单位定点帮扶工作的意见》，面对乡村振兴新情况、新需求，在产业振兴、人才振兴、文化振兴、生态振兴、组织振兴等方面统筹推进，切实帮助定点帮扶的河南省社旗县在实现脱贫攻坚的基础上，全面高质量乡村振兴。2021 年，中国通号集团公司投入乡村振兴帮扶资金 543.52 万元，累计投入无偿帮扶资金 2,056.52 万元。

On February 25, 2021, General Secretary Xi Jinping solemnly announced at the National Poverty Alleviation Summary and Commendation Conference that my country's poverty alleviation battle has achieved a comprehensive victory. As a SOE, CRSC has actively implemented the spirit of General Secretary Xi Jinping's important instructions on implementing the rural revitalization strategy, continued to consolidate the achievements of poverty alleviation, and promoted effective connection with rural revitalization.

CRSC has implemented the "Opinions on Persistence in the Central Unit's Targeted Assistance Work", and in the face of the new situation and new needs of rural revitalization, it has made overall plans for revitalization of industries, skilled workforce, culture, ecology, and organizations in rural areas. Sheqi County, Henan Province, which has been designated areas of CRSC, has achieved comprehensive high-quality rural revitalization on the basis of poverty elimination. In 2021, CRSC invested 5.44 million yuan in rural revitalization and assistance funds, and a total of 20.57 million yuan in non-reimbursable assistance funds.



2021 年 9 月，中国通号与社旗县联合举办“驻村干部抓党建促乡村振兴素质能力提升培训班（第一期）”

In September 2021, CRSC and Sheqi County jointly held the "Quality and Ability Improvement Class for Village Cadres to Grasp Party Construction and Promote Rural Revitalization (Phase I)"


中国通号集团公司 2021 年助力社旗县乡村振兴“成绩单”

CRSC Group's Rural Revitalization Deed to Help Sheqi County in 2021

指标 Indicators	单位 Unit	2021
投入无偿帮扶资金 Non-reimbursable assistance funds invested	万元 10,000 yuan	500
引入无偿帮扶资金 Non-reimbursable assistance funds attracted	万元 10,000 yuan	10
培训基层干部 The number of grassroots cadres trained	名 people	358
培训技术人员 The number of technicians trained	名 people	104
购买农产品 Agricultural products purchased	万元 10,000 yuan	179.1
帮助销售农产品 Agricultural products sold	万元 10,000 yuan	61

中国通号助力社旗县乡村振兴举措

CRSC's Rural Revitalization Measures to Help Sheqi County



产业振兴
Revitalization of Industries

- ▮ 建设保鲜库、育种育苗大棚等设施，依托中药材产业扶贫基地带动本地用工，持续打造致富产业振兴路线
- ▮ 成功引进河南昌盛丰农业科技有限公司落户社旗县，全年实际投资到位 7,000 万元

Built fresh-keeping warehouses, breeding greenhouses and other facilities, drove local employment by the Chinese herbal medicine industry, and continued to create a revitalization route

Successfully introduced Henan Changshengfeng Agricultural Technology Co., Ltd. to settle in Sheqi County, with an actual investment of 70 million yuan throughout the year



人才振兴
Revitalization of Skilled Workforce

- ▮ 中国通号党委坚持把乡村人力资源开发放在首要位置，结合社旗实际，加大对基层干部的培训教育
- ▮ 2021 年，分别举办了 1 期驻村第一书记乡村振兴专题培训班、2 期驻村干部素质能力提升培训班、1 期技术人员专题培训班、1 期乡村致富带头人培训班，培训乡村基层干部 358 名、培训乡村振兴致富带头人 95 名、农业技术人员 104 名，为全面推进乡村振兴、加快农业农村现代化提供有力人才支撑

The CRSC Party Committee insisted on putting the development of rural human resources in the first place, and increased the training and education for grass-roots cadres in light of the actual situation of Sheqi County

In 2021, 1 special training course on rural revitalization for the first secretary in the village, 2 training courses on improving the quality and ability of resident cadres, 1 special training course for technical personnel, and 1 training course for leaders in getting rich in villages were held to train the grassroots in the villages, totally training 358 cadres, 95 leaders for rural revitalization, and 104 agricultural technicians, providing strong talent support for comprehensively promoting rural revitalization and rural modernization




文化振兴
Revitalization of Culture

- ▮ 修缮革命旧址、省级重点文物保护单位等重点建筑，擦亮红色记忆
- ▮ 建设村文化广场、宣传文化栏、指示牌等基础设施，提升乡镇整体形象和群众幸福感

Repaired the memorial place of revolutionary, cultural relics and other key sites to polish the red memory

Built village cultural squares, cultural columns, signs and other infrastructure to enhance the overall image of the township



生态振兴
Revitalization of Ecology

- ▮ 改善帮扶村庄人民群众的人居环境，完善农村生活设施

Improved the living environment and the facilities in the villages



组织振兴
Revitalization of Organization

- ▮ 积极开展党建共建活动，属地驻豫企业通号电气化局所属党组织与社旗县 6 个贫困村党支部和 4 个企业支部，共 10 个支部签订党建共建协议，在夯实党建基础、协助制度建设、群团活动等方面整合资源，持续开展结对子帮扶，切实把党的政治优势、组织优势和密切联系群众优势转化为巩固脱贫攻坚战的强大力量

Actively carried out party building and co-construction activities. The party organizations affiliated to the CRSC Electrification Company in Henan, signed party building and co-construction agreements with party branches of 6 poor villages and 4 enterprise in Sheqi County to integrate resources in system construction, group activities, etc., carry out paired assistance, and to close contact with the masses to consolidate the victory against poverty



持续保障
Consistent Assistance

- ▮ 持续巩固“两不愁三保障”成果，累计帮扶慰问特殊群众 832 名，发送慰问金 20.8 万元，进一步防范返贫致贫风险
- ▮ 向饶良镇卫生院划拨 5 万元，用于购买人脸测温消毒一体机，有效减轻医院疫情防控工作压力

Continued to consolidate the achievements of "basic living needs access" campaign, aiding a total of 832 people with special needs, and 208,000 yuan being sent to further prevent poverty returning

Allocated 50,000 yuan to Raoliang Town Health Center for the purchase of an all-in-one temperature measurement and disinfection machine, effectively prevent the epidemic in the hospital



消费帮扶
Assistance through Consumption

- ▮ 大力宣传引导中国通号各级企业工会、后勤食堂部门优先采购定点帮扶县以及新疆等脱贫地区的农副产品
- ▮ 鼓励引导社旗县 5 家符合条件的加工企业、农业合作社、家庭农场加入央企消费帮扶电商平台，帮助当地加工企业和农业合作社拓宽销售渠道

Vigorously publicized and guided the labor unions and canteen of CRSC enterprises at all levels to purchase agricultural and sideline products from designated counties such as Xinjiang

Encouraged and guided 5 eligible processing enterprises, agricultural cooperatives, and family farms in Sheqi County to join the e-commerce platform to help local processing enterprises and agricultural cooperatives expand sales channels

抓好疫情防控 Strengthening COVID-19 Prevention and Control

中国通号持续高度关注新冠肺炎疫情形势，深入贯彻习近平总书记重要指示精神，落实党中央、国务院决策部署，坚持人民至上、生命至上，从严从细从实抓好疫情防控各项工作，在疫情防控大战大考中，充分发挥中央企业顶梁柱、国家队的作用。

CRSC continued to pay close attention to the situation of the COVID-19, thoroughly implement the spirit of General Secretary Xi Jinping's important instructions, and the decisions of the Party Central Committee and the State Council. Adhering to the people first and life first, CRSC better prevented the epidemic in a strict and meticulous manner, giving full play to the role of SOEs.



加强领导， 落实责任 Strengthening Leadership and Fulfilling Responsibilities

面对仍旧严峻的疫情防控形势，中国通号及所属企业提升政治站位，及时成立并调整疫情防控领导小组及工作小组，统筹做好疫情防控工作，第一时间传达党中央、国务院、国资委疫情防控有关决策部署，落实各级疫情防控主体责任，筑牢疫情期间安全防线。

In the face of continuously severe epidemic, CRSC and its affiliated enterprises established leading group and adjusted the epidemic prevention and control in a timely manner, coordinated the epidemic control work, and conveyed the decision and deployment from the Party Central Committee and the State Council and the SASAC. It implemented the main responsibilities of epidemic control at all levels, and built a solid line of defense.

严密防控， 保障生产 Strictly Preventing the Virus and Ensuring Production

中国通号坚持疫情常态化防控不松懈，做细做实各项防控工作。加强疫情防控物资储存管理，确保防疫物资储备和供应；加强员工健康监测，严格日常测温、扫码、询问、登记等防控工作；推进新冠疫苗接种，引导员工“应接尽接”，构筑防疫屏障；做好防疫宣传工作，增强员工防护意识；定期发放防疫消毒物品，以最大努力保障员工生命健康安全，保障生产经营活动有序开展。

Adhering to the normalized prevention mechanism, CRSC did not slack off and guaranteed prevention carefully. It strengthened the storage management of materials to ensure the reserve and supply of epidemic prevention materials; strengthened employees health monitoring by daily temperature measurement, health QR scanning, inquiry, and registration; promoted vaccination rollout and encourage employees being vaccinated as soon as possible to build an epidemic prevention barrier. Besides, through all kind of publicity, the Group enhanced employees' awareness of protection. Anti-epidemic and disinfection items were distributed on a regular basis to ensure the life, health and safety of employees and ensure the daily production and business activities.



担当使命， 支援战“疫”

Taking on the Mission and Supporting the War against the Virus

中国通号积极组建疫情防控志愿服务队，按照属地新冠肺炎疫情防控工作相关要求，投身疫情防控一线，全力配合支持社区有序做好核酸检测和日常消杀等防疫工作。中国通号所属企业积极配合所在地开展疫情防控，组织党员骨干组成志愿服务队，投身疫情防控一线，参与现场接种疫苗秩序引导、预约登记等志愿服务，以实际行动为疫情防控贡献力量。

CRSC actively set up a volunteer service team for epidemic prevention and control. In accordance with the relevant requirements on the epidemic prevention and control, CRSC joined the front line for medical service, and fully cooperated and supported the community to carry out the epidemic prevention work such as nucleic acid testing and daily disinfection. CRSC's affiliated companies actively cooperated with the local community to carry out epidemic prevention and control, organized party members to form a volunteer service team, participated in on-site vaccination service, appointment registration and other volunteer services, contributing to epidemic prevention and control with practical actions.

开展志愿服务

Carrying out Volunteering Services



中国通号持续开展志愿服务工作，稳步扩大“同心筑梦”志愿者队伍规模，组织引导员工积极主动参与公益活动、志愿服务，真情回馈社会。

CRSC continued to carry out volunteer service, steadily expanded the scale of the volunteer team of "Building Dreams Together", organized and guided employees to actively participate in public welfare activities and volunteer services, and gave back to the society with sincerity.



中国通号组织青年志愿者参与全国学雷锋志愿服务活动，开展走访慰问贫困家庭、慰问孤寡老人等活动

Young volunteers of CRSC participated in the national volunteer activities of "Learn from Lei Feng", and visited poor families and elderly

01



中国通号青年志愿者队伍火速驰援河南开展防汛救灾，全力保障郑州沿线铁路信号设备恢复通行

The CRSC youth volunteer team to Henan carried out disaster relief, and made every effort to ensure the restoration of railway signal equipment along the Zhengzhou line

02



中国通号卡斯柯志愿者参与美化滨江森林江岸行动，以实际行动守护绿水青山

CRSC CASCO volunteers participated in the action of beautifying the riverside forests, protecting lucid waters and lush mountains with practical actions

03



上海工程局集团组织青年志愿者开展当地公园入园秩序维护、宣讲相关政策等服务

CRSC Shanghai Engineering Group Co., Ltd. organized young volunteers to carry out services and publicize relevant policies

04

未来展望

Future Outlook

展望 2022 年，中国通号将踔厉奋发、笃行不怠，完整、准确、全面贯彻新发展理念，以高质量发展为主线，锚定“十四五”发展目标，砥砺奋进，致力成为以轨道交通控制技术为特色的世界一流企业，在推进中华民族伟大复兴进程中实现通号人的共同梦想。

Looking forward to 2022, CRSC will work hard and persistently, fully, accurately and comprehensively implement the new development philosophy, focus on high-quality development, anchor the development goals of the "14th Five-Year Plan", and forge ahead. We are committed to becoming a world-class enterprise featuring traffic control technology, and realizing the common dream of CRSC people in the process of promoting the great rejuvenation of the Chinese nation.

坚持创新驱动，创建世界一流。我们将坚持创新发展理念，围绕国家“新基建”系列布局，加强科技创新，推进关键技术实现深度自主可控，坚持全链条自主化研发，促进高水平科技自立自强，以实际行动助力新时代网络强国、交通强国建设。

Adhering to innovation-driven to create the world-class. We will adhere to the concept of innovative development, focus on the national "New Infrastructure" plan, strengthen scientific and technological innovation, promote key technologies to achieve deep autonomy and control. By independent research and development of the entire chain, we will continue to promote R&D self-reliance, with practical actions to help the construction of a network power and transportation power in the new era.

坚持服务至上，创造持续价值。我们将加强标准化建设，精细质量管理，打造卓越产品，提升精益服务，建设卓著品牌；健全安全管理体系，落实安全监管责任，防范化解重大风险，保障轨道交通运营安全；推进数字化转型协同，加快提升工业制造信息化、智能化水平，以通号科技高质量服务全球客户。

Adhering to service first to create sustainable value. We will strengthen standardization, fine quality management, create excellent products, improve lean services, and build outstanding brands. We will improve the safety management system, implement safety supervision responsibilities, prevent and resolve major risks, and ensure the safe operation of rail transit. By promoting digital transformation and coordination, we will accelerate the improvement of manufacturing informatization and intelligence, and serve global customers with high-quality CRSC technology.

坚持低碳发展，培育绿色动能。我们将科学推进“双碳”工作，积极推动绿色低碳转型，优化能源结构，提升能源效率，开展绿色低碳技术攻关研究和应用，促进减污降碳协同增效；强化重点领域治理和生态环境保护，为建设生态文明聚能发力。

Adhering to low-carbon development to cultivate green kinetic energy. We will scientifically promote the "Carbon Peak & Carbon Neutrality", actively promote green and low-carbon transformation, optimize energy structure,

improve energy efficiency, carry out research and application of green and low-carbon technologies, and promote synergy of pollution reduction and profit creation. We will strengthen the governance of key areas and ecological environmental protection, and make efforts to build an ecological civilization.

坚持以人为本，赋能成就英才。我们将坚持平等雇佣，增进员工福利，保障员工权益；推进人才开发，完善培养与激励机制，培育和汇聚优秀人才，助力员工成长；用心关爱员工，聚焦员工所需，丰富多彩生活，增强员工凝聚力、幸福感。

Adhering to people-oriented to empower talents. We will adhere to employment equality, enhance employee benefits, and protect employee rights. We will promote talent development, improve training and incentive mechanisms, cultivate and gather outstanding talents, and help employees grow. We will continue to care for employees with heart, focusing on employees' needs, enriching their lives, and enhancing employees' cohesion and happiness.

坚持开放协调，推进合作共赢。我们将立足国内国际双循环的新发展格局，深化产学研合作，促进上中下游融通创新、协同发展，增强产业链供应链韧性和竞争力；拓深稳健开展境外投资和生产经营，更高水平参与“一带一路”建设，为构建人类命运共同体贡献力量。

Adhering to openness and coordination to promote win-win cooperation. Based on the dual circulation development pattern, we will deepen the cooperation between industry, academia and research, promote the integration, innovation and coordinated development of upstream, midstream and downstream, and enhance the resilience and competitiveness of the industrial chain and supply chain. We will steadily carried out overseas investment, production and operation, participate in the construction of the Belt and Road at a higher level, contributing to the construction of a community with a shared future for mankind.

坚持成果共享，增添民生福祉。我们将继续坚持“人民至上”理念，将社会责任融入企业战略和日常运营，全面推进乡村振兴，促进共同富裕；抓好疫情防控，服务“六稳”“六保”；开展志愿服务，践行公益慈善，为构建和谐社会贡献央企责任担当。

Adhering to the sharing of results to increase people's livelihood and well-being. We will continue to adhere to the concept of "people first", integrate social responsibility into corporate strategies and daily operations, comprehensively promote rural revitalization, and promote common prosperity. We will strengthen COVID-19 prevention and ensure "stability on the six fronts" and "security in the six areas". We will continue to carry out voluntary services, practice public welfare and charity, and contribute to the responsibility of SOEs for building a harmonious society.

附录 Appendix

ESG 指标索引 HKEX ESG Reporting Guide

指标披露 General Disclosures and KPIs		页码 Page No.
范畴：环境 A: Environment		
A1: 排放物 Aspect A1: Emissions		
一般披露 General disclosure		P70、P73、P76-P78
A1.1	排放物种类及相关排放数据 The types of emissions and respective emissions data	P73-P74、P78
A1.2	直接（范围 1）及能源间接（范围 2）温室气体排放量（以吨计算）及（如适用）密度（如以每产量单位、每项设施计算） Direct (scope 1) and indirect energy (scope 2) of greenhouse gas emissions (in tons) and, where appropriate, intensity (e.g. per unit of production volume, per facility)	P73-P74
A1.3	所产生有害废弃物总量（以吨计算）及（如适用）密度（如以每产量单位、每项设施计算） Total hazardous waste produced (in tons) and, where appropriate, intensity (e.g. per unit of production volume, per facility)	P78
A1.4	所产生无害废弃物总量（以吨计算）及（如适用）密度（如以每产量单位、每项设施计算） Total non-hazardous waste produced (in tons) and, where appropriate, intensity (e.g. per unit of production volume, per facility)	P78
A1.5	描述所订立的排放量目标及为达到这些目标所采取的步骤 Describe emission targets set and the steps taken to achieve these goals	P73-P78
A1.6	描述处理有害及无害废弃物的方法及描述所订立的减废目标及为达到这些目标所采取的步骤 Description of how hazardous and non-hazardous wastes are handled, the waste reduction goals set and the steps taken to achieve these goals	P76-P78
A2: 资源使用 Aspect A2: Use of resources		
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A2.2	总耗水量及密度（如以每产量单位、每项设施计算） Water consumption in total and intensity (e.g. per unit of production volume, per facility)	P71
A2.3	描述所订立的能源使用效益目标及为达到这些目标采取的步骤 Description of energy use efficiency initiatives and steps taken to achieve these targets	P70、P73-P74
A2.4	描述求取适用水源上可有任何问题，以及所订立的用水效益目标及为达到这些目标所采取的步骤 Description of issues (if any) in sourcing water that is fit for purpose, water use efficiency initiatives and steps taken to achieve these targets	P70

指标披露 General Disclosures and KPIs		页码 Page No.
A2.5	制成品所用包装材料的总量（以吨计算）及（如适用）每生产单位占量 Total packaging material used for finished products (in tons) and, if applicable, with reference to per unit produced	P71
A3: 环境及天然资源 Aspect A3: Environment and natural resources		
一般披露 General disclosure		P70
A3.1	描述业务活动对环境及天然资源的重大影响及已采取管理有关影响的行动 Description of the significant impacts of activities on the environment and natural resources and the actions taken to manage them	P70
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一般披露 General disclosure		P73-P74
A4.1	描述已经及可能会对发行人产生影响的重大气候相关事宜，及应对行动 Description of the significant climate issues that have and may affect the issuer, and actions taken to address them	P73-P74
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雇佣及劳工准则 Employment and Labor Standards		
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B1.2	按性别、年龄组别及地区划分的雇员流失比率 Employee turnover rate by gender, age group and geographical region	P82
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B2.2	因工伤损失工作日数 Lost days due to work injury	P91
B2.3	描述所采纳的职业健康与安全措施，以及相关执行及监察方法 Description of occupational health and safety measures adopted, how they are implemented and monitored	P65-P67、P91

指标披露 General Disclosures and KPIs		页码 Page No.
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B3.1	按性别及雇员类别（如高级管理层、中级管理层）划分的受训雇员百分比 The percentage of employees trained by gender and employee category (e.g. senior management, middle management)	P90
B3.2	按性别及雇员类别划分，每名雇员完成受训的平均时数 The average training hours completed per employee by gender and employee category	P90
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B4.1	描述检讨招聘惯例的措施以避免童工及强制劳工 Description of measures to review employment practices to avoid child and forced labor	P82-P83
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一般披露 General disclosure		P102-P103
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B5.2	描述有关聘用供货商的惯例，向其执行有关惯例的供货商数目，以及有关相关执行及监察方法 Description of practices relating to engaging suppliers, number of suppliers where the practices are being implemented, how they are implemented and monitored	P102-P103
B5.3	描述有关识别供应链每个环节的环境及社会风险的惯例，以及相关执行及监察方法 Description of practices relating to identifying environmental and social risks at each link of the supply chain, how they are implemented and monitored	P102-P103
B5.4	描述在拣选供应商时促使多用环保产品及服务的管理，以及相关执行及监察方法 Description of management promoting the use of environmental products and services in selecting selection, how they are implemented and monitored	P102-P103
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一般披露 General disclosure		P58
B6.1	已售或已运送产品总数中因安全与健康理由而须回收的百分比 Percentage of total products sold or shipped subject to recalls for safety and health reasons	P59
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指标披露 General Disclosures and KPIs		页码 Page No.
B6.3	描述与维护及保障知识产权有关的惯例 Description of practices relating to observing and protecting intellectual property rights	P47
B6.4	描述质量检定过程及产品回收程序 Description of quality assurance process and recall procedures	P61
B6.5	描述消费者资料保障及隐私政策，以及相关执行及监察方法 Description of consumer data protection and privacy policies, implementation and monitoring methods	P58-P63
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B7.1	于汇报期内对发行人或其雇员提出并已审结的贪污诉讼案件的数目及诉讼结果 Number of concluded legal cases regarding corrupt practices brought against the issuer or its employees during the reporting period and the outcomes of the cases	P28
B7.2	描述防范措施及举报程序，以及相关执行及监察方法 Description of preventive measures and whistle-blowing procedures, how they are implemented and monitored	P28-P29
B7.3	描述向董事及员工提供的反贪污培训 Description of the anti-corruption training provided to directors and staff	P28-P29
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B8.1	专注贡献范畴（如教育、环境事宜、劳工需求、健康、文化、体育） Focus areas of contribution (e.g. education, environmental concerns, labor needs, health, culture, sport)	P106-P113
B8.2	在专注范畴所动用资源（如金钱或时间） Resources contributed (e.g. money or time) to the focus area	P106-P113

评级报告

《中国铁路通信信号股份有限公司 2021 环境、社会及管治报告》评级报告

受中国铁路通信信号股份有限公司委托，“中国企业社会责任报告评级专家委员会”抽选专家组成评级小组，对《中国铁路通信信号股份有限公司 2021 环境、社会及管治报告》（以下简称《报告》）进行评级。

一、评级依据

中国社会科学院《中国企业社会责任报告指南（CASS-CSR 4.0）》暨“中国企业社会责任报告评级专家委员会”《中国企业社会责任报告评级标准（2020）》。

二、评级过程

1. 评级小组审核确认《报告》编写组提交的《企业社会责任报告过程性资料确认书》及相关证明材料；
2. 评级小组对《报告》编写过程及内容进行评价，拟定评级报告；
3. 评级专家委员会副主席、评级小组组长、评级小组专家共同签署评级报告。

三、评级结论

过程性 (★★★★☆)

公司党群工作部牵头组建报告编制工作组，统筹具体编制工作并把控关键节点，党委会、董事会把控报告整体方向并负责报告终审；将报告定位为合规披露履责信息、规范企业治理、提升企业形象、回应资本市场诉求的重要工具，功能价值定位明确；结合国家宏观政策、国际国内社会责任标准、公司发展战略、利益相关方调查等识别实质性议题；计划通过官方网站发布报告，并将以电子版、印刷品、中英文版的形式呈现报告，过程性表现领先。

实质性 (★★★★★)

《报告》系统披露了贯彻宏观政策、产品质量管理、科技创新、数字化转型、安全生产、员工权益保护、环保产品研发、节约能源资源等所在行业关键性议题，叙述详细充分，具有卓越的实质性表现。

完整性 (★★★★☆)

《报告》主体内容从“创新驱动，蓄积发展动能”“服务至上，铸就卓越品质”“绿色赋能，践行‘双碳’目标”“以人为本，增进员工福祉”“协力同行，打造共赢格局”“情系社会，共享美好生活”等角度系统披露了所在行业核心指标的 86.63%，完整性表现领先。

平衡性 (★★★★★)

《报告》披露了“生产安全一般及以上责任死亡事故”“特种设备一般及以上责任事故”“工程质量一般及以上责任事故”“全年流失员工数”“员工流失率”等负面数据，并简述针对不良行为供应商的处理措施，平衡性表现卓越。

可比性 (★★★★★)

《报告》披露了“承担国家级科研项目”“主参编行业技术标准”“中级管理层员工培训百分比”“女性员工人均培训时长”“综合能源消耗量”“综合能源消耗强度”等 48 个关键指标连续 3 年的对比数据，并通过“位列《2021 中国品牌 500 强》第 201 位”进行横向比较，可比性表现卓越。

可读性 (★★★★★)

《报告》采用议题型框架结构，从六个篇章全面解读年度履责理念、行动与成效，框架结构清晰，重点议题突出；封面设计采用插画风格，融入主营业务元素，凸显行业特征，增强了报告的辨识度；篇章跨页以全景实景图呈现特色履责场景，呼应章节主题，提升了报告的感染力；设计风格清新明快，图文搭配相得益彰，具有卓越的可读性表现。

创新性 (★★★★★)

《报告》积极响应“一带一路”、“双碳”行动、乡村振兴等热点时政议题，彰显了中央企业的责任担当；各章开篇简述企业履责理念和关键议题，提纲挈领，总领性强，创新性表现优秀。

综合评级 (★★★★★)

经评级小组评价，《中国铁路通信信号股份有限公司 2021 环境、社会及管治报告》为五星级，是一份卓越的企业社会责任报告。



中国通号环境、社会及管治报告连续第二年获得五星级评价

四、改进建议

1. 增加行业核心指标的披露，提升报告的完整性；
2. 增强报告框架与内容的时代感，提升报告的创新性。

评级专家委员会副主席

钟宏武 徐华
评级小组组长 评级小组专家

出具时间：2022 年 3 月 18 日



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Rating Report

Rating Report of “The 2021 Environmental, Social and Governance Report of China Railway Signal & Communication Co.,LTD.”

Upon the request of China Railway Signal & Communication Co.,LTD., the Chinese Expert Committee on CSR Report Rating invited experts to form a rating team to rate *The 2021 Environmental, Social and Governance Report of China Railway Signal & Communication Co.,LTD.* (hereinafter referred to as “the Report”).

I. Rating Criteria

Guidelines on China's Corporate Social Responsibility Reports (CASS-CSR 4.0) by Chinese Academy of Social Sciences, and *Rating Standards on China's Corporate Social Responsibility Reports (2020)* by China Expert Committee on CSR Report Rating.

II. Rating Process

1. The Rating Panel reviews and confirms *CSR Report Process Materials Confirmation* and supporting documents submitted by the CSR Report Compiling Group;
2. The Rating Panel assesses the preparation process and contents of CSR Report, and drafts the Rating Report;
3. Vice Chairman of China Expert Committee on CSR Report Rating, the Leader and experts of the Rating Panel jointly review and sign the Rating Report.

III. Rating Results

Process (★★★★☆)

The party and mass work department of the Company took the lead in setting up a working group for the preparation of the *Report* to coordinate the specific preparation work and control the key work links. The party committee and the board of directors controlled the overall direction of the *Report* and were responsible for the final review of the *Report*, positioning the *Report* as an important tool for compliantly disclosing the information, regulating the corporate governance, improving the corporate image and responding to the demands of the capital market, with clear functional value positioning; identifying the substantive issues based on national macro policies, international and domestic social responsibility standards, corporate development strategies, stakeholder investigations, etc; planning to release the *Report* through the official website and present the *Report* in electronic version, printed version, Chinese and English version, with leading performance in process.

Substantiality (★★★★★)

The *Report* systematically disclosed all key industrial issues, such as the implementation of macro policies, the product quality management, the scientific and technological innovation, the digital transformation, the safe production, the protection of the employee rights and interests, the research and development of environmental protection products and the conservation of energy and resources, with detailed and full narration and excellent substantiality performance.

Integrity (★★★★☆)

The main body of the *Report* systematically disclosed 86.63% of the core industrial indicators from the perspectives of "driving the development through innovation and accumulating the momentum for development", "putting service first and creating excellent quality", "empowering with greenness and practicing the dual carbon initiative", "observing the people-oriented principle and improving the employee welfare", "going together and creating win-win situation" and "loving the society and sharing good life", with leading integrity performance.

Balance (★★★★★)

The *Report* disclosed the negative data, including "accident of average or above liability regarding production safety", "accident of average or above liability regarding special equipment", "accident of average or above liability regarding engineering quality", "annual turnover of employees" and "employee turnover rate", and briefly described the handling measures over suppliers with bad behavior, with excellent balance performance.

Comparability (★★★★★)

The *Report* disclosed the comparative data of 48 indicators such as "undertaken national scientific research projects", "participated industrial technical standards", "percentage of training of middle management staff", "average training hours per female staff", "comprehensive energy consumption" and "comprehensive energy consumption intensity" for three consecutive years. In addition, it also made a horizontal comparison based on the data of "ranking 201st among 2021 Top 500 Chinese Brands", with excellent comparability performance.

Readability (★★★★★)

The *Report* adopted the topic-based framework structure, comprehensively interpreting the annual concepts, actions and results of responsibility performance through six chapters, with a clear framework structure and prominent key topics. The cover design adopted the illustration style and integrated the main business elements to highlight the characteristics of the industry and enhance the identification of the Report. The double spread of the chapter adopted panoramic real map to present the characteristic responsibility performance scene, which echoed the theme of the chapter and improved the appeal of the Report. The design style was fresh and lively, the pictures and text collocations complementing each other, with excellent readability performance.

Innovativeness (★★★★★)

The *Report* actively responded to hot current political issues such as the "Belt and Road" Initiative, the "Carbon Peak & Carbon Neutrality" action and rural revitalization, demonstrating the responsibilities of the central enterprises. Each chapter began with a brief introduction of the corporate accountability concepts and key issues, concentrating on the main points, with good innovativeness performance.

Overall Rating (★★★★★)

The 2021 Environmental, Social and Governance Report of China Railway Signal & Communication Co.,LTD. was rated as five stars by the rating team. It is an excellent corporate social responsibility report.



The 2021 Environmental, Social and Governance Report of China Railway Signal & Communication Co.,LTD. gained the five-star evaluation for a second consecutive year.

IV. Improvement Suggestions

1. Increase the disclosure of industrial core indicators, and further increase the report integrity;
2. Enhance the sense of times of the framework and contents of the Report and improve the innovativeness of the Report.

评级专家委员会副主席

Vice Chairman of China Expert Committee on CSR Report Rating

钟宏武 徐华
Panel Leader Panel Expert

Date of Issuance: March 18, 2022



Scan the QR code to view the corporate rating files

意见反馈 Feedback

尊敬的读者，您好：

非常感谢您在百忙之中阅读《中国铁路通信信号股份有限公司 2021 环境、社会及管治报告》。
为持续改进中国通号环境、社会及管治工作，我们希望聆听您的意见和建议，请您在百忙之中
扫描下方二维码，对我们的报告提出宝贵意见。



Hello, Dear reader

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