EUROPEAN DAC DELIVERY PROGRAMME
Enabled by Shift2Rail

Digital Automatic Coupling

DELIVERY PROGRAMME

DEFINITION

Digital Automatic Coupling (DAC) is an innovative component to automatically couple and decouple the rolling stock in a freight train both physically (the mechanical connection and the air line for braking) as well as digitally (electrical power and data connection). DAC is key to enable the needed increase in efficiency and transparency of rail freight.

BACKGROUND

Screw coupling is still today the coupling standard for freight trains in European countries. Coupling is done manually by a worker who must climb between wagons to hook and un-hook them, requiring physically exhausting manual operation in a hazardous environment.
A more efficient, sustainable and competitive rail freight system is essential to meet the needs of both climate protection and rising transport volumes. Digital automatic coupling is an enabler to create a modern and digital European railway freight transport. It will not only increase efficiency thanks to automation processes, but it will also ensure sufficient energy supply for telematics applications, as well as safe data communication throughout the entire train.

DAC AT A GLANCE

- A unique opportunity to revolutionise rail freight systems in Europe.
- An enabler for the digital transformation to fully automated of railway operations with competitive efficiency.
- An interoperable component that will unlock more capacity and use of new technologies and innovations, enabling a shift to rail which will in turn facilitate climate protection and economic growth.

THE OPPORTUNITIES

The introduction of Digital Automatic Coupling is urgently needed for the entire European rail freightway sector and is an essential prerequisite for:

- automatic (de)coupling/shunting;
- ETCS Level 3 as well as Automatic Train Operation (ATO), moving blocks for freight trains;
- increasing capacity of the entire system;
- reducing costs and process time;
- increasing safety and process reliability;
- paving the way to intelligent freight trains;
- enabling heavier and longer freight convoys as the coupler can deal with stronger forces.

The combination of the DAC with other current and future digital technologies in rail freight will maximize the opportunity for a mission oriented system transformation.

EUROPEAN DAC DELIVERY PROGRAMME UNDER THE LEADERSHIP OF SHIFT2RAIL

For a successful and effective implementation of DAC, it is of crucial importance to have open, close and efficient cooperation between railway undertakings, infrastructure managers and wagon keepers, as well as the rail supply industry, entities in charge of maintenance, concerned sector organisations, rail research centres and national and European political institutions. The European DAC Delivery Programme, under the leadership of Shift2Rail, offers a unique European platform for such cooperation and collaboration.

THE BENEFITS FOR ALL INVOLVED EUROPEAN RAILWAY ACTORS

	Infrastructure Manager	Railway Undertaking	Wagon Keepers	Manufacturers	Shippers
Increasing competitiveness	Allows heavier, longer & faster trains, increasing capacity	Less shunting, higher capacity Acceleration of shunting. Increase of system reliability and speed	Reduces maintenancefor coupling, bogies etc.	Create new market opportunities after a test bed in Europe	Higher loading, increasing the attractiveness of rail freight due to shorter preparation time
Enabling automation and digital change	Secures train integrity (essential for ETCS 3) removing infrastructure from the ground Facilitates integration of localisation/ communication functions as well as monitoring features integrated in the digital freight train	Secures train integrity (essential for ETCS 3) without special end of train device Reduces manual processes like brake test and train initialisation Allows automated railway operation Facilitates implementation of rolling stock health-related functions	Increases wagon availability through predictive maintenance enabled by monitoring features	Allows the development of integrated competitive digital services at subsystem and train level	Increases attractiveness of rail freight
Reducing derailing risk and noise	Reduces risk of derailing	Reduces risk of derailing and noise Increases safety during shunting	Reduces risk of derailing and noise	Decreases complexity of technical solutions addressing safety and energy at system level	Increases safety & security during shunting

REQUIREMENTS FOR A SUCCESSFUL IMPLEMENTATION

- Gradual **integration of all European DAC initiatives into the "European DAC Delivery Programme"**:

1. The activities of the TIS (Technical Innovation Circle for Rail Freight), the Shift2Rail (Innovation Programme 5) activities, and the results of the current study on the DAC funded by the German Federal Ministry of Transport and Digital Infrastructure, are integrated into the European DAC Delivery Programme.
2. The European Programme is set-up in an efficient, target-oriented structure, including a programme board (taking implementation decisions), a supervisory board (ensuring sectorial alignment and political support at European level), a programme manager (responsible for the delivery of qualitative and timely programme results) and seven work packages with a clearly defined remit.

WORK PACKAGES

1. Technology, Regulation & Standardization, Operations
2. Test, Demonstrator & Pilot Projects
3. Migration Strategy
4. Rail System capacity & ERTMS
5. Business Cases and Financing
6. Communication & Dissemination
7. Intelligent Freight Train

- Ensuring a **transparent selection and implementation** of a consistent, open, comprehensively tested, safe European DAC (single system)
- Laying down the **uniform requirements** in a standard "DAC type 4" (as target system with upward compatibility to DAC type 5), a referenced standard in the respective Technical Specifications for Interoperability (TSI)
- Development of a common, smart, coordinated, **Europe-wide uniform migration plan** with a minimal transition and conversion phase from the existing system to the DAC target system, with the aim of equipping all relevant freight wagons with DAC by 2030 at the latest, taking into account the necessary funding programmes and framework conditions.
- Provision of **significant funding and special financing models** at the European level combined with national instruments in order to:
  1. be able to cope with the necessary investments (8.5 billion EUR for approximately 500,000 freight wagons, plus interoperability with the respective locomotives)
  2. create incentives and capacity to keep the transition and conversion phase as short as possible (including vital compensation for any necessary early depreciation)
  3. compensate operational difficulties during this transition to conversion phase and to avoid negative effects on rail freight transport during this period
  4. create a level playing field for the retrofitting throughout Europe, requiring selective financing models at European and national level.