Press Release

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HGK Shipping and Hydrogenious to design an emission-free inland waterway vessel with hydrogen carrier technology

Duisburg / Cologne. Europe's largest inland waterway shipping company, HGK Shipping, and the Hydrogenious LOHC Maritime and Hydrogenious LOHC Technologies companies signed a memorandum of understanding (MoU) at the beginning of May. Steffen Bauer, the CEO of HGK Shipping, announced this in the presence of invited guests from the worlds of logistics, science and industry as part of a self-initiated hydrogen event in Cologne on 4 May 2023. The goal is to develop a scalable solution to make hydrogen available as a source of energy on a large scale. The technology is based on hydrogen, which is bound in a liquid carrier (LOHC, liquid organic hydrogen carrier). The two partners are planning to develop a demonstration vessel by 2028 and then put it into service; it will be possible to propel the ship with a fuel cell, which is fed with energy from the hydrogen released from the LOHC.

The "HyBarge" project is due to be initiated in 2024. The cooperation partners have already launched the concept phase. This will not only involve experts from HGK Shipping, but also concept developers from Hydrogenious LOHC Maritime and Hydrogenious LOHC Technologies. The latter are currently gaining important experience about the emission-free use of the LOHC technology in shipping, which they will then transfer to inland waterway shipping as part of the project. Green hydrogen is viewed as the key element to cover the urgent and vital task of decarbonising shipping. It is conceivable in a further stage that LOHC transport operations could be tested and promoted on inland waterways using the demonstration vessel, although this does not form part of the MoU. The demonstrator therefore has the potential to map the complete value-added chain, ranging from producing the LOHC to using the drive technology and transporting goods and even ensuring that potential customers can use the vessel.

Conventional solutions to store and transport hydrogen consume vast amounts of energy and are extremely risky procedures. The LOHC process at Hydrogenious involves using benzyl toluene – a thermal oil, which is hardly flammable and is non-explosive – and its risk potential is as low as that of diesel fuel. The carrier oil, which is loaded with hydrogen, can also be stored at ambient conditions as regards its pressure and temperature and also has a competitive storage density level.

Häfen und Güterverkehr Köln AG Press office Scheidtweilerstrasse 4 50933 Cologne
☎ 0221 390-1190 0221 390-1191 presse@hgk.de www.hgk.de

“We want to successfully introduce the maritime LOHC drive technology to the especially high safety requirements of inland waterway shipping within the HyBarge project. HGK Shipping will be the ideal partner in this respect. We’ll also use the expertise that we’ve gained during the last two years in developing LOHC powertrains for commissioning/service operation vessels,” says Øystein Skår, the General Manager of Hydrogenious LOHC Maritime.

Dr Daniel Teichmann, the Chairman of the Board of Directors at Hydrogenious LOHC Maritime and the CEO and founder of Hydrogenious LOHC Technologies, adds, “We’re stepping out in order to make significant progress in the energy transition in the transport sector together with HGK Shipping. Decarbonised mobility solutions and transport operations along the sensitive network of rivers in Europe can become reality using existing infrastructure, thanks to our safe LOHC technology.”

Steffen Bauer, the CEO of HGK Shipping, adds, “Introducing the demonstration vessel could be more than just a milestone in achieving climate-neutral inland waterway shipping – the same could be true for industry, which will depend on energy sources such as hydrogen to decarbonise its operations. Hydrogenious’ LOHC technology has enormous potential for use, particularly when compared to other hydrogen derivatives. However, what is more important is that it doesn’t need any special tank technology, with the result that this LOHC can be made available within the existing infrastructure both on land and on the water.”

In order to use the hydrogen bound in the LOHC as a fuel, the demonstration vessel must have special technology, which has to be installed on board, so that it is able to separate it from the carrier medium. This takes place using the dehydrogenation unit, which Hydrogenious has developed. The hydrogen is then fed to the fuel cell. The “discharged” carrier material, benzyl toluene, can be temporarily absorbed to the hydrogen again in a chemical process at the stationary LOHC infrastructure (storage and release equipment) further downstream. This is possible several hundred times – and the substance can then be recycled too.

Contact details:

Hydrogenious LOHC
Birka Friedrich
Press spokesperson
Phone: +49 160 561 9001
E-mail: birka.friedrich@hydrogenious.net

HGK-Gruppe
Christian Lorenz
Press spokesperson
Phone: +49 221 390 11 90
E-mail: lorenzc@hgk.de

About the HGK Group:
Häfen und Güterverkehr Köln AG (HGK) is the logistics company within the City of Cologne’s public utilities group. Formerly just a port operator, HGK has developed into a group that provides integrated transport and logistics services with operations across Europe. Structured in five divisions, Logistics & Intermodal, Shipping, Rail Operations, Infrastructure & Maintenance and Real Estate, the HGK Group operates the largest inland waterway port network in Germany, one of the largest private railway companies for transporting cargo, specialist logistics firms and terminals as well as its own railway network and workshops for

railway goods traffic through its subsidiaries and holding companies. HGK Shipping GmbH is the largest inland waterway shipping company in Europe.
www.hgk.de

About the HGK Shipping division:
HGK Shipping is part of Häfen und Güterverkehr Köln AG. Its fleet comprises about 350 vessels, including owner-operated ships. The spectrum of goods transported ranges from liquid chemical products and liquefied gases to dry goods and even break bulk cargo.
www.hgkshipping.de

About Hydrogenious LOHC Maritime:
Hydrogenious LOHC Maritime AS, which has its headquarters in Norway, is developing and marketing a new kind of onboard power system for shipping, which is based on an LOHC & fuel cell solution. This enables Hydrogenious LOHC Maritime to provide emission-free shipping operations with a safe and efficient hydrogen carrier, which is very easy to handle. This joint venture was founded in 2021 by the German company, Hydrogenious LOHC Technologies GmbH, an international pioneer and market leader in the field of liquid organic hydrogen carriers, and the Norwegian shipping group, Johannes Østensjø dy AS.
www.hydrogenious-maritime.net

About Hydrogenious LOHC Technologies:
The Hydrogenious LOHC corporate group associated with its key company, Hydrogenious LOHC Technologies, provides the missing link for flexible hydrogen supply chains around the globe. Based on its proprietary Liquid Organic Hydrogen Carrier (LOHC) technology, the market pioneer, which was founded in 2013, enables hydrogen to be stored and transported in a particularly safe, simple and efficient manner – with a high level of storage density at ambient conditions and using conventional liquid fuel infrastructure. The portfolio of the scale-up based in Erlangen and its joint venture and subsidiary companies now covers stationary and mobile (on-board) LOHC-based applications – and they include turn-key (de)hydrogenation units, operations & maintenance as well as LOHC logistics.
www.hydrogenious.net

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