Full Speed Ahead for Ultimate Efficiency

Trailblazing Process Water Filtration System For Stripping Ships

The global shipping industry has been under pressure since long before the economic crisis. Rising costs and falling utilization of capacity are the prominent aspects of the fraught competitive situation. Even more now than ever, time is money, and consistent optimization of all operational processes is essential to survival. The pressure to meet repair and maintenance deadlines for freight ships is immense. Idle time for cleaning and renewing the outer shell coating is only a few days. Innovative technologies that efficiently treat process water offer a significant competitive advantage. Increasingly stringent environmental requirements, particularly in regard to waste water, mean that the washing water used in paint removal and its subsequent economic disposal play an even greater role. Legislators are currently working on stricter regulations intended to ensure complete proof of proper waste removal. An innovative mobile filter station has been introduced just in time: This trendsetting device minimizes the expense of treating waste water and properly disposes of the solid waste. The filter station was developed by the company Renetex S.r.L. in Bozen, which specializes in the development, production and sale of process water treatment equipment. The heart of the unit is the compact filter system MAXFLOW – made by GKD, Gebr. Kufferath AG – that combines filtration and briquetting in one device.

The pivotal impulse for the development of this mobile filter station was Volkert Meinz's passion for filtration and shipping. The CEO of Beinlich Pumpen GmbH, supplier of gear and radial piston pump systems headquartered in Gevelsberg, spent many years going to sea as a technical officer and knows all about the challenges of removing old paint from ships. He applied his background to developing the technology for this filtering system. The prototype has been in operation for a year in Hamburg at one of the most renowned shipyards in the world. Another year was spent on development before that. Findings from previous successful applications of the equipment, for example in pipe rehabilitation of water supply lines to power plant turbines, were integrated.

Less Water for Greater Economy

Stripping the paint from freight and container ships, which can be over 350 meters long, is extremely time-consuming. Several thick and hard protective coatings of varying consistencies comprise a layer between 700 µm and 2 mm thick, which has to be partially or completely removed before a new coating can be applied. Today, these massive coatings are usually stripped using high-pressure water jets. This method, also called water blasting, allows paint to be removed without harming the workers or polluting the environment with dust. Pressure of up to 4000 bar is applied quickly and gently to remove the old surface coating, a process that is much less harmful than former dry blasting with quartz sand or fine-grained copper slag grit. An added benefit of this new method is that the fresh coatings last longer, because the salt is purged out of the surface pores of the ship's hull. But the ultimate benefit of water blasting is that there is no contaminated abrasive to dispose of afterwards. Modern high-pressure jet systems include suction mechanisms that apply a vacuum to collect the paint-contaminated water right at the hull of the ship. The water flows into

an intermediate storage vessel at the dock and is then conveyed to the waste water treatment system. Depending on the size and the number of high-pressure pumps used, 50 to 200 litres of water are required per minute, which corresponds to 3 to 12 cubic meters per hour. This process is economic only with a closed process water circulation system that drastically reduces the consumption of fresh water. Efficient waste water treatment is the key element. That was the weak point until now. The sedimentation procedure commonly used at construction sites requires space, time, a multitude of chemicals and costly disposal. The new mobile filter station offers an effective alternative. By combining a series of filtration steps – one of which is the crucial mechanical particle separation – with simultaneous compression of the solid matter, the fresh water consumption decreases from up to 12 cubic meters per hour to the same quantity in several weeks.

MAXFLOW for Mechanical Particle Separation

The mobile filter station that separates the paint residue from the water is shipped by a truck with one or two swap Bodies to the site where it is needed. A pump conveys the waste water from the tanks at the docks to the filter station. The integral system for chemical and mechanical filtration purifies the contaminated process water to full-fledged service water, and at the same time permits cost-efficient disposal of the old paint. The MAXFLOW 504 compact filter system, consisting of a filter head with built-in press as well as a controller and other process water inlet and outlet components made by Beinlich, takes care of the mechanical filtration. Two tanks that feed water to the filter round off the ensemble. The MAXFLOW 504 filter head is composed of statically positioned vertical filter disks made of the multi-dimensional stainless steel composite mesh YMAX designed explicitly for this process. The filter head was developed by GKD-

CompactFiltration, an independent business unit of GKD specializing in filter technology and equipment engineering. The feed material cross-flows around the disks. Automatic backwashing disengages the filter cake from the disks, then the integrated press compresses it to form a non-drip briquette. The specific parameter settings are entered directly on the system via the PROFIBUS-capable controller. A remote maintenance feature allows data to be queried and settings to be adjusted through an interface accessible by mobile phone.

Fluctuating Consistencies of Waste Water

The waste water produced when paint is stripped from ships poses a tough challenge to the filter. In addition to paint particles, the water contains organic substances such as algae and other oceanic organisms that settle on the hull or in the sea water. And then there are heavy metals from the paint or even asbestos particles, matter for which the filter, which normally works without the addition of filter aids - was not designed for. Fluctuating inlet concentrations – particularly dilution from rain or variable environmental factors – mean that the filter has to work even harder. To counteract these factors, the waste water is chemically pre-treated before mechanical filtration. In order to achieve a formation of filter cake during the mechanical filtration of the fine particles, the MAXFLOW filter head in the mobile filter station – unlike other applications – uses filter aids. The integrated press compresses the filtered solid matter to form non-drip briquettes. The solid blocks, with remaining moisture of less than 60%, drastically reduce the amount of hazardous waste and thus the disposal costs. The purified water is then treated to produce full-fledged process water. An additional chemical filtration step treats the waste water again, ensuring that it meets the stringent requirements for feeding it into the local sewage system.

Efficient, Flexible and Legally Compliant

Based on a rate of 80 EUR per ton of water, the savings potential of this method of water disposal is up to 960 EUR per hour! A significant saving considering the current economic pressure placed on businesses. And this method also ensures that the legal consent levels are met – levels that will be further tightened again in 2012. The compact design of the filter station is well suited to the time and space limitations on the docks. Because of the enormous time constraints and a chronic lack of space, the system provides the shipyard operators with a solution they have been urgently seeking – a solution that can be quickly implemented on land without structural modifications. Because it is so mobile, the system can easily be moved to any dock where it is needed, so utilization capacity is ideal. Not only shipyards can profit from this system: Cleaning companies that offer paint stripping services can also reap the benefits.

Superior Solution for Process Water from Ship Stripping

Volkert Meinz, the mind behind the patent-pending system, is convinced that the mobile filter station is a significant milestone for economic ship stripping. "The ship maintenance industry has been waiting for such a solution for years. The treatment method for process water from paint stripping will be significantly faster and more economical." He can also envisage applications in bridge and tank cleaning. He sees the anticipated tightening of the law as even more reason to promote the equipment: "Keeping the new laws in mind, which will require proof of disposal, the new mobile filter station offers shipyards and cleaning firms the operational reliability they need at an affordable price." Sascha Schoenecken, sales manager of GKD-CompactFiltration, sees the success of the MAXFLOW 504 filter head as additional proof of the superiority of the compact filter concept. "The combination of the process-dependent selection of filter

materials and the process-specific settings makes MAXFLOW the perfect choice for such complex challenges."

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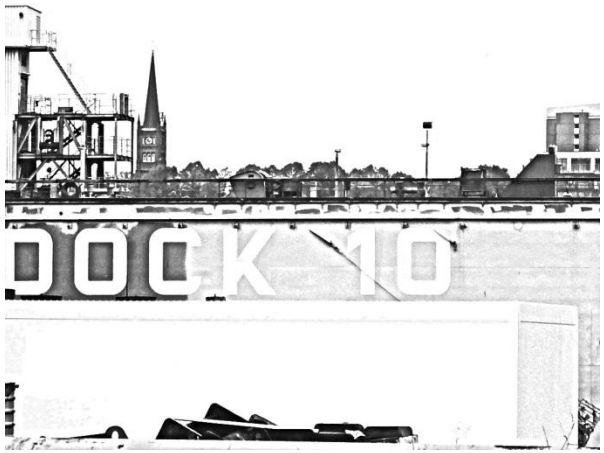

Picture 1: The mobile filter station comes into operation at the docks.

Picture 2: Waste water tanks feed the mobile filter station.

Picture 3: The filter system MAXFLOW in action with the integrated press.

Picture 4: The mobile filter station for the treatment of the process water from paint stripping.

We will be happy to send you the desired images in printable resolution by e-mail.

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Picture 5: Process water from the stripping ships before the filtration.

Picture 6: Controlling the sedimentation.

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