Field Report

FILTRATION FT 324I WASTE TREATMENT

Caster Water Filtration for Wheel or Twin Belt Type Casters used in Copper Rod Production (Patent Pending)

APPLICATION

In the process of producing copper rod by means of the "Continuous Cast" method, soot, graphite or carbon black is applied to the caster wheel or dam blocks as protective thermal barrier. As molten metal is poured onto the caster wheel or dam blocks and formed into a bar, the carbon-based thermal insulator also acts as a mold release. The bar is then cooled with rinse water before being rolled into rod. This rinse water becomes contaminated with the carbon material which was applied to the caster wheel or dam blocks resulting in reduced production, reduced life of caster wheel, or dam blocks, bands and increased maintenance for heat exchangers and cooling towers.

PROBLEM

Due to the extremely fine sub-micronic particulate size of the carbon material, it has been virtually impossible to remove it from the rinse water by conventional filtration methods including ultrafiltration. Hence, facilities typically send a larger portion of the caster rinse water to drain or waste treatment and makeup with fresh water to dilute the carbon material concentration. As a result, water usage and discharge volumes increase and downstream treatment of the discharged caster water is required as well as discharge fees for compliance. In addition, high concentrations of the carbon material in the caster water cause plugging and fouling of heat exchangers and cooling towers.

EQUIPMENT

Due to the need to filter the caster water, Filtertech has developed proprietary separation chemistry FTI-320A which coagulates and flocculates the sub-micronic particles into a stable floc. Once formed, the floc is removed with a "High Performance" Deep Bed Gravity Filter as shown in Figure 1. The process with special features uses a coagulant/flocculating agent which is not sensitive to overdosing, chemical instability but is consistently repeatable. The very small percentage of flocking agents are removed with the accumulated solids via the filter media.

Figure 1
Model HGF "High Performance"
Deep Bed Gravity Filter

PROCESS

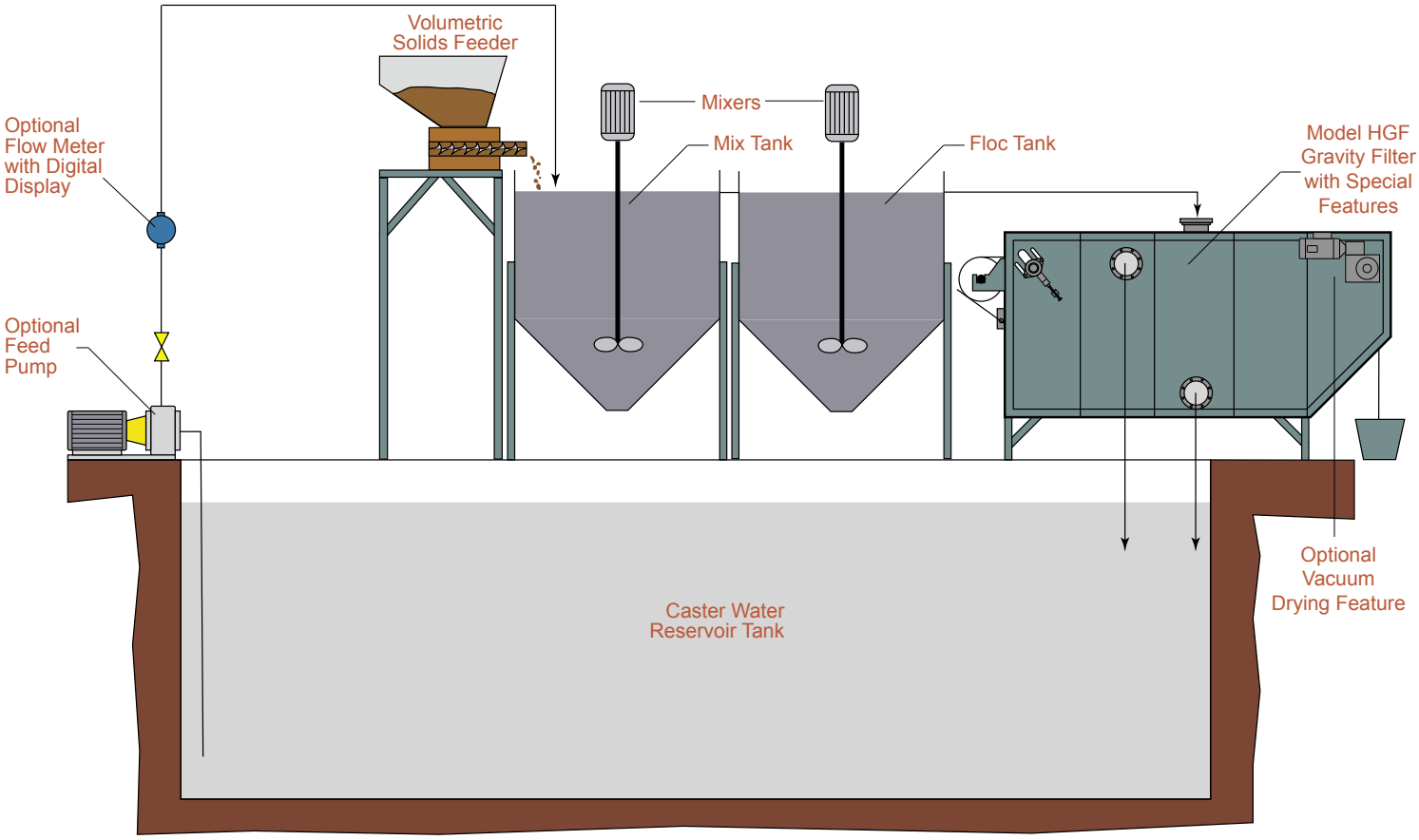
The dirty caster water is pumped on a bypass basis from the reservoir tank by a transfer pump to a mixing tank which is specifically sized and designed for the flow rate to be treated (see Figure 3). The FTI-320A separation chemistry is then added to the caster water in the mixing tank by way of a volumetric solids feeder and is stored in a bulk solids hopper requiring only periodic replenishing. The feeder utilizes a variable speed drive which can adjust the feed rate of the FTI-320A chemistry to coincide with changes in flow rate of caster water to the system.

Figure 2
Treatment System

During the mixing process, the chemistry becomes hydrated, and its long chain molecule is unraveled. The sub-micronic particulates become entrapped in the molecule to form a much larger floc particle which is removed through efficient gravity bed filtration. Specially-designed mixers are used to minimize size reduction on the developing floc particles.

Once completely mixed the caster water overflows by gravity into the Model HGF "High Performance" Deep Bed Gravity Filter (see Product Bulletin FT234D). As the caster water passes through the filter, the flocked solids are removed by the disposable filter media, thus allowing only the clean water to drain by gravity back to the reservoir tank for reuse.

Figure 3
Caster Water Filtration
System Concept



The Model HGF Deep Bed Gravity Filter has specific features for the application which include the following:

- Deep operating bed with extended liquid pool for increased pressure drop across the media.
- Multi-function media index assembly.
- Low velocity internal and external inlet header to enhance separation of chemistry prior to entering the filter.
- Extended discharge ramp to enhance drying of filter "cake" prior to discharge.
- Fully-automatic media indexing and low media sensor.
- Positive filter side seals.
- Available in 304 or 316 stainless steel construction.
- Optional vacuum drying feature for media discharge.

The cost of operation of this treatment system consists of the chemistry, filter media, electricity and very minimal manpower requirements.

RESULTS

The result (see Figure 4) of incorporating filtration of the caster water is a significantly clean rinse water, improved product quality, increased production up-time, reduced wheel/dam block replacement/maintenance, reduced hollow bar breaks and reduced heat exchanger/cooling tower maintenance. Discharge of the water to drain is eliminated or greatly reduced with the remaining carbon contaminant being safely discharged into a receptacle for conventional disposal.

The system is fully automatic and continuous flow, not a batch process achieving significant reductions in "NTU" values. Current system capacity range from 5,000 GPD (19,000 LPD)to over 150,000 GPD (570,000 LPD).

Total operating estimated costs which includes separation chemistry, filter media, and electrical costs averages less than .09 cents /gallon of water treated. Equipment and installation costs are typically amortized in less than 11 months with continued significant operating savings and increased production.

Figure 4
Dirty Caster Water (left), Clean Filtrate (right)

FILTERTECH

Main Office/Factory
113 Fairgrounds Drive, P.O. Box 527
Manlius, NY 13104-0527
TEL: 315-682-8815; FAX: 315-682-8825
Web Site: www.filtertech.com
e-mail: info@filtertech.com

West Region Office
8400 S. Kyrene Rd., Suite 227, Tempe, AZ 85284
TEL (480) 775-1111; FAX (480) 775-0604

Printed in U.S.A. 4/10