

# The Importance of Demulsifier Mixing

### *Introduction*

The mixing of chemical demulsifiers with an emulsion is not a simple blending operation. It is definitely not the case where more mixing is better. It is a parameter that is difficult to quantify, and one that becomes more critical as the batch size increases.

RECOVEROL\* ECO Demulsifiers and ECA\* Water Demulsifiers are surface-active chemicals that work on the particulate or droplet level. They act by neutralizing the effects of emulsifiers, coagulating solids and water droplets, thereby allowing the solids and water to separate under the influence of gravity.

Once the demulsifier "binds" itself to a portion of the emulsion, it will not readily distribute to other portions. Thus, some of the emulsion will be "overtreated" and some "undertreated."

### *Unacceptable Mixing*

- 1. Pouring chemical over the top of the tank and expecting downward movement.**
- 2. Pouring chemical into an empty tank then filling with waste stream.**

### *Unreliable Mixing*

#### **Air Mixing**

Description: The chemical is poured on top of the emulsion in a holding tank while compressed air is introduced at the bottom.

- Problems: \*
- Air pushes upward through a layer of loosely stabilized emulsion in the presence of fine solids. This causes remixing with the cleaner phase at the top.
  - \* Severe agitation may shear the water/oil interface and cause re-emulsification.
  - \* Cold air mixing for an extended period may cool the heated tank too rapidly for effective separation.

#### **Pump Circulation**

Description: The emulsion is circulated from top-to-bottom or bottom-to-top for a least one turn-around while the chemical is poured at the top of the tank.

Problems: In a large tank, especially where both suction and inlet points are on the same side, this is what happens:

- \* A significant volume of the emulsion will receive little or no chemical.
- \* The chemical concentration based on the total volume may overtreat the actual volume circulated. This may worsen the problem.
- \* Continued agitation may re-emulsify phases which have already separated.
- \* A poor choice of pump, such as a centrifugal pump, may actually make the result worse than the initial.

## *The ECI Method*

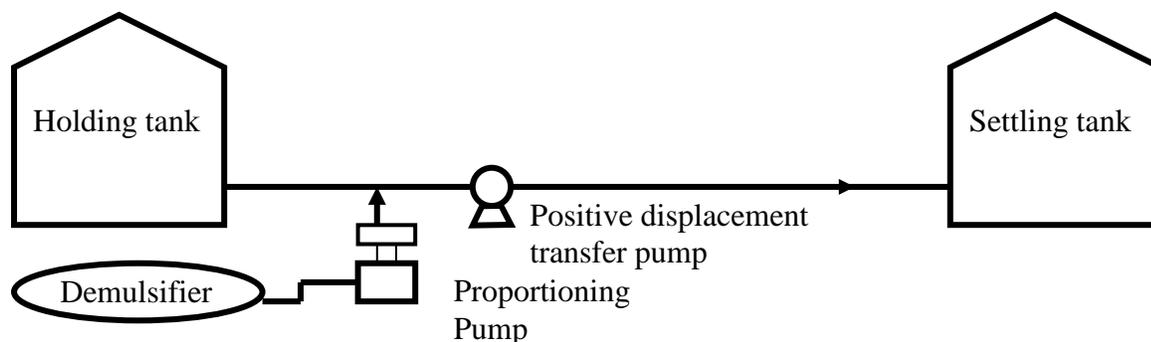
ECI has promoted the concept of TRANSFER-INJECTION for demulsifier mixing and has been successful in treating oilfield, refinery, and industrial waste streams using this method.

### Procedure:

- \* Preheat emulsion if necessary and pump from a holding tank to a receiving tank with a positive displacement pump.
- \* ECO or ECA demulsifiers should be continuously injected into the suction or discharge side of the transfer pump by means of a chemical proportioning pump.
- \* Once transferred, allow the treated emulsion to settle, maintaining heat if necessary.

### Benefits:

- \* UNIFORM DISTRIBUTION of the chemical throughout the entire volume of emulsion.
- \* IDEAL AGITATION for chemical. Short/vigorous mixing followed by longer, gentle mixing.
- \* EASY OPERATION: Chemical pump can be switched on at the same time as the transfer pump. This permits intermittent treatment, batch splitting, and closer monitoring.
- \* MINIMAL DISTURBANCE in both tanks allowing natural settling and the prevention of re-emulsification.
- \* SIMPLE AND RELIABLE means of monitoring chemical action. The operator can determine the separation in the tank by sampling the treated emulsion. This allows optimization of the chemical concentration during the transfer rather than waiting until the end of the mixing period when it may be too late.



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