Split-flows wastewater

Split-flows wastewater

Split-flows wastewater

Definition:

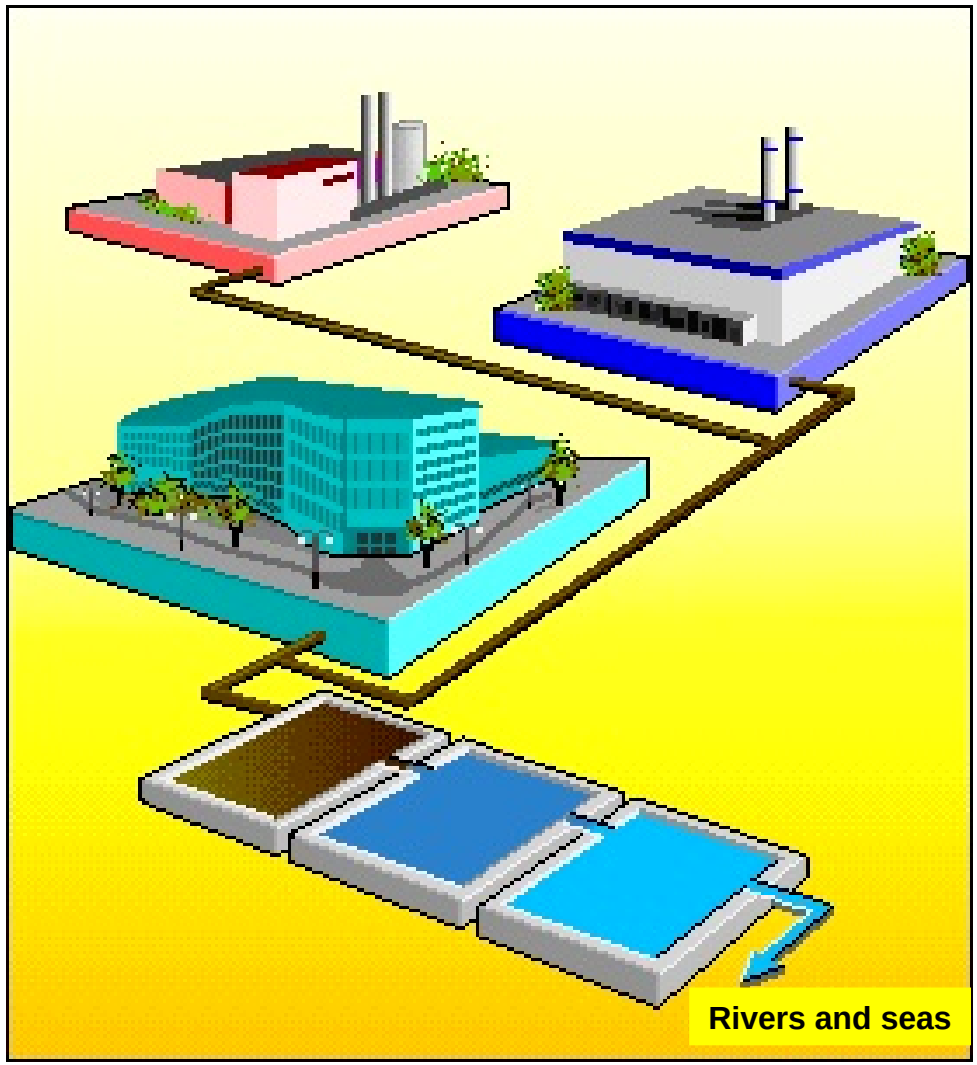
- Split-flow wastewater are **continuous and discontinuous industrial wastewater as well as cooling and rainwater.**

- **Industrial waste water consist of e.g.:**

  - **Wastewater from production plant, auxiliary plant and laboratory.**

As a matter of principle suitable technology should be used to avoid wastewater as much as possible or at least reduce them to the minimum!

Split-flows wastewater



Split-flows wastewater

ICPR/ICPE recommendations:

- To keep split-flow wastewater caused by accidental discharge under control, ICPR/ICPE have pronounced suitable recommendations (Excerpts):
  - Early detection of accidentally discharged contaminated split-flow wastewater with suitable measures of monitoring,
  - Containing accidentally discharged contaminated split-flow wastewater near the source of discharge, if necessary the sewer for their collection should only be for this purpose,
  - No mixture of contaminated split-flow wastewater with other wastewater,
  - Provision of retention facilities of adequate size,

Split-flows wastewater

- **Measures (e.g. holding ponds, re-circulation of wastewater) must be provided for preventing contamination of waters in the event of an accidental reduction in the purification capacity of the treatment plant,**
- **The wastewater systems must be tight and resistant to the expected physical, chemical, thermal and biological stress,**
- **Ensure the safe disposal of accidentally contaminated wastewater as well as split-flow wastewater,**
- **Danger prevention plan should be put in place and this should contain the whole preventive measures,**
- **The efficiency of the measures taken must be proofed by conducting regular and recurrent checks !**

Split-flows wastewater

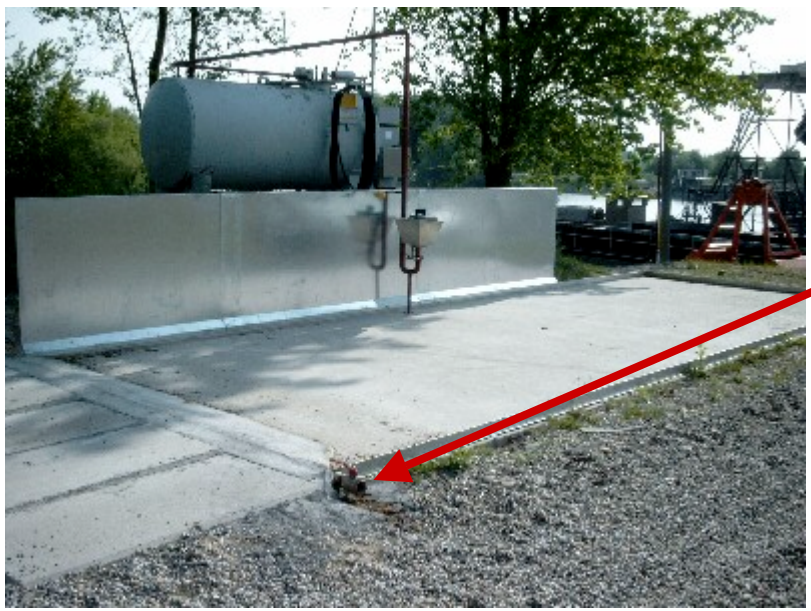
- **Examples of measures for the implementation of the ICPR/ICPE recommendations:**
  - **Monitoring of contaminated split-flow wastewater:**
    - **Regular view checks of the retention or containing facilities,**
    - **Sampling of the contaminated split-flow wastewater,**
    - **Use automatic analysing equipment – use this systems to monitor the split-flow wastewater and the system should be able to triggers off an alarm automatically or emergency measures such as automatic activation of a shut-off device to interrupt the discharge of split-flow wastewater should be installed among other measures.**

Split-flows wastewater

- **Retaining near the source of discharge**
  - **Install drainage systems in such a way that water can be drained when necessary,**
  - **Outdoor retaining facilities for storage and transshipment facilities which are drained through the sewage system should be equipped with shut-off valves in such a way that substances hazardous to water can be held back,**
  - **Installation of automatic shut-off devices !**

Split-flows wastewater

Example of a drainage system



Split-flows wastewater

- **Avoiding mixing of different types of wastewater:**
  - **Possibilities of temporarily separating contaminated wastewater or**
  - **Shut-off of the sewage system for wastewater in case of accidental discharge,**
  - **Installation of e.g.:**
    - **Shut-off devices, which can be quickly shut up to avoid mixing up of contaminated wastewater with other wastewater.**

Split-flows wastewater

- **Retaining split-flow wastewater and tightness of retainment facilities**
  - **Provide retainment facilities (as a temporary measure with a long-term intension of converting them to permanent facilities),**
  - **Assessing their tightness by conducting regular view checks and repairing visible damages immediately,**

Split-flows wastewater

- **Retainment facility** in form of a Gully with tight cover

Split-flows wastewater

- **Operation and function of wastewater treatment plants/sewage plant:**
  - **regular monitoring of the cleaning efficiency by checking the quality before a direct or indirect discharge of the treated contaminated wastewater into the public sewage system,**
  - **provision of retainment facilities (with enough retention capacity and which are liquid-proofed),**
  - **Equip the facilities with shut-off device to stop the discharge of wastewater into public wastewater systems or surface waters,**
  - **automatic monitoring devices to stop the discharge of contaminated wastewater into public wastewater systems,**
  - **modern production technologies and technical systems to avoid accidents that could lead to the contamination of wastewater**

Split-flows wastewater

- **Tightness and durability of the wastewater treatment plant:**
  - **Checking the visible parts of the wastewater treatment plant in respect of the internal and external condition of the facility,**
  - **Repair/replacement of damaged components,**
  - **Checking the suitability and durability of the materials used towards the wastewater composition using available documents of the plant,**
  - **Tightness test of the wastewater treatment plant,**
  - **Shutting down and replacing unsuitable plant components.**

Split-flows wastewater

Disposal of contaminated wastewater:

- Specifying necessary measures and needed personnel,
- Providing the necessary technical prerequisites as:
  - Container (as means of transport),
  - mobile pumps,
  - flexible pipes to transport the wastewater,
  - Devices for analysing the wastewater

Split-flows wastewater

Storing in temporary transportable container (IBC), barrels, etc.

Split-flows wastewater

Hazard control planning:

- Put the most important preventive measures to be taken in the case of an accident or breakdown in writing,
- Determine and specify necessary measures in conjunction with external experts,
- Specify the necessary information to be reported and the content of such report in conjunction with the local authority responsible for such cases,
- Development of internal alarm/danger prevention plans,
- Conduct danger prevention training using internal and external experts and means.

Split-flows wastewater

Conducting checks:

- Assigning responsibilities and duties (Organizational charts or the like),
- Training of production plant staff on how to carry out inspections,
- The inspections should guarantee the following:
  - Ascertain the efficiency of the split-flow wastewater monitoring,
  - Examination of the visible parts of the wastewater system in regard to leakage, excessive corrosion or other defects,
  - Involvement of independent/external expert in the inspection of the wastewater system.

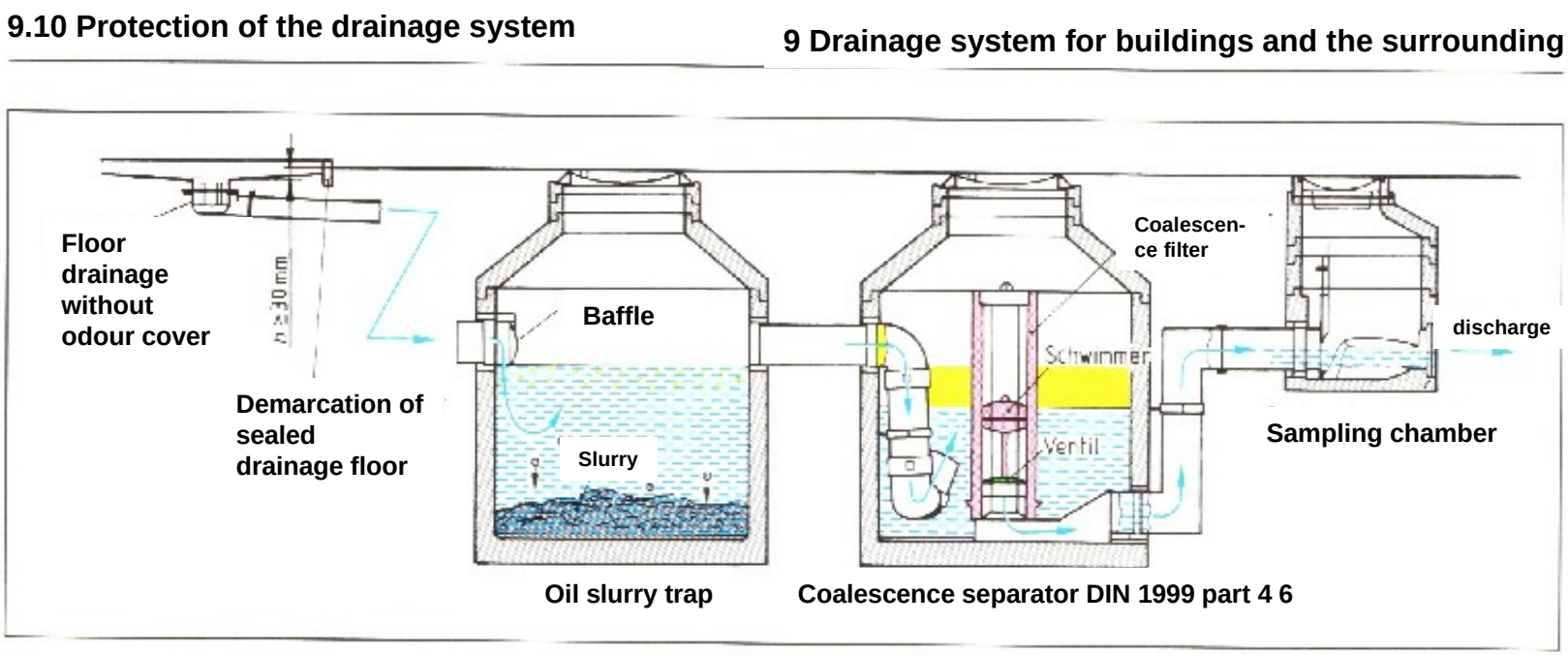
Split-flows wastewater

- **Water pollution control in the river basin areas is the basis for the protection of their function as source of portable water supply and the preservation of our environment. Contaminated wastewater must be treated and cleaned with appropriate method before being released to the natural circle. An effective wastewater treatment plant is therefore very important. The following are some few examples of different methods:**

1. **Low-density-liquid separating plant,**
2. **Treatment plant for industrial waste water**
3. **Mechanical - biological waste water treatment plant.**

Split-flows wastewater

Example of a waste water treatment plant:



1 Calescence separator – Example of a design

Coalescence separator

Split-flows wastewater

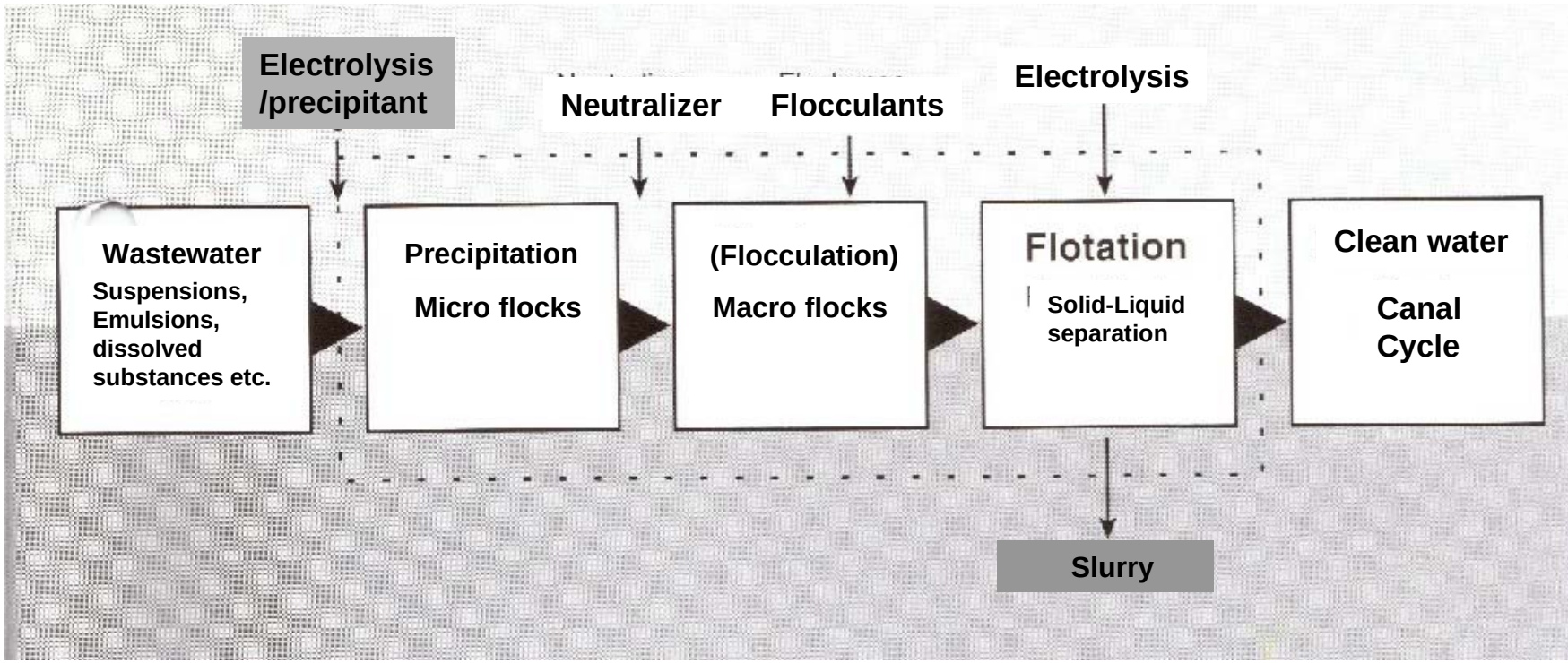
1. Principle of a coalescence separator for low-density-liquids

It consist in general of the following parts

- Slurry trap,
- Coalescence separator and
- Sample port/chamber.

- In addition to the separation by the force of gravity, a physical process (coalescence) is also effective in this separator. Coalescence is the conglomeration of finely dispersed low-density liquid droplets to larger drops which floats to the surface after attaining a certain drop size. Coalescence separator contain an application made of different materials with large surface.

Split-flows wastewater



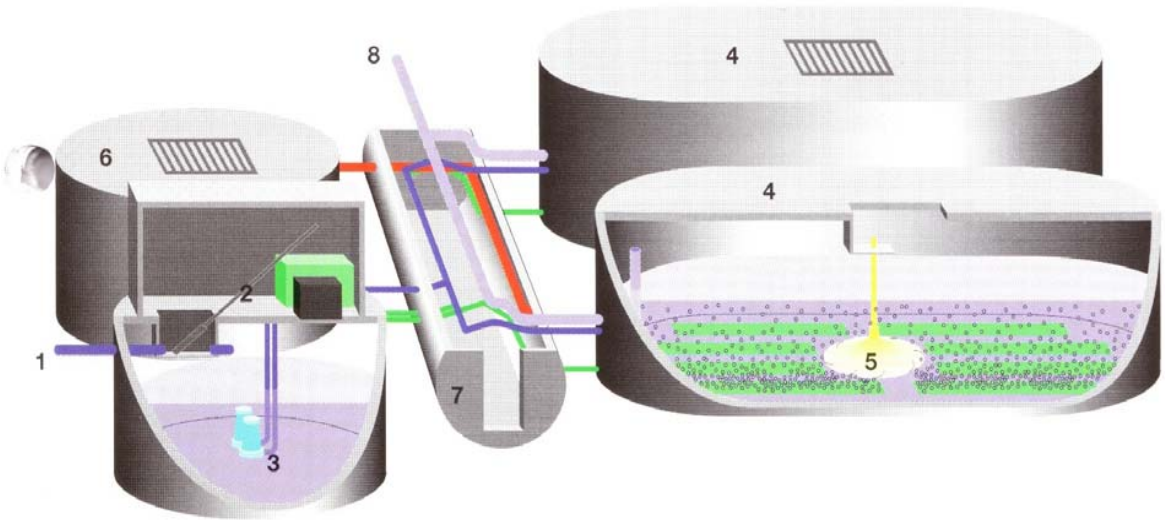
Treatment plant for industrial waste water

Split-flows wastewater

2. Principle of a treatment plant for industrial waste water:

- In a sort of percolation process, the pollutants in the wastewater are removed by adding precipitants and flocculants. The macro flocks are separated by flotation process.

Split-flows wastewater



1- Influent
2- Screening
3- Buffer vessel
4- Reactors
5- Agitator
6- Pre-concentrator
7- Space for installation
8- discharge

This is an improved „activate-sludge process“
As a sort of mechanical-biological process:

- **Removal of coarse and harmful materials,**
- **Breaking down of dissolved contaminants, conversion to biomasses,**
- **Separation of biomass and cleaned water.**

Biological wastewater treatment plant - SBR -

(sequential biological treatment)

Split-flows wastewater

- **Mechanical-biological wastewater treatment plant**

  - **The wastewater goes through a process of clarification.**
    The 3 steps shown on the sketch takes place in the reactor. The reactor is alternatively used for different treatment stages. Very good results have been achieved by this method of treatment. This method is now one of the most modern of it‘s type today.

Split-flows wastewater

Summary:

- The preceding explanations are supposed to serve as a help for those specialists such as operator, authorities and also other external experts responsible for checking and assessing wastewater treatment facilities. The purpose is to, as much as possible allow a consistent and comparable results so as to be able to take a uniform assessment in regard to the quality and extent of necessary repair work, retrofitting or installation of new wastewater systems. The same applies to the checking and assessment of the hazard control plans and the efficiency of the measures taken.