

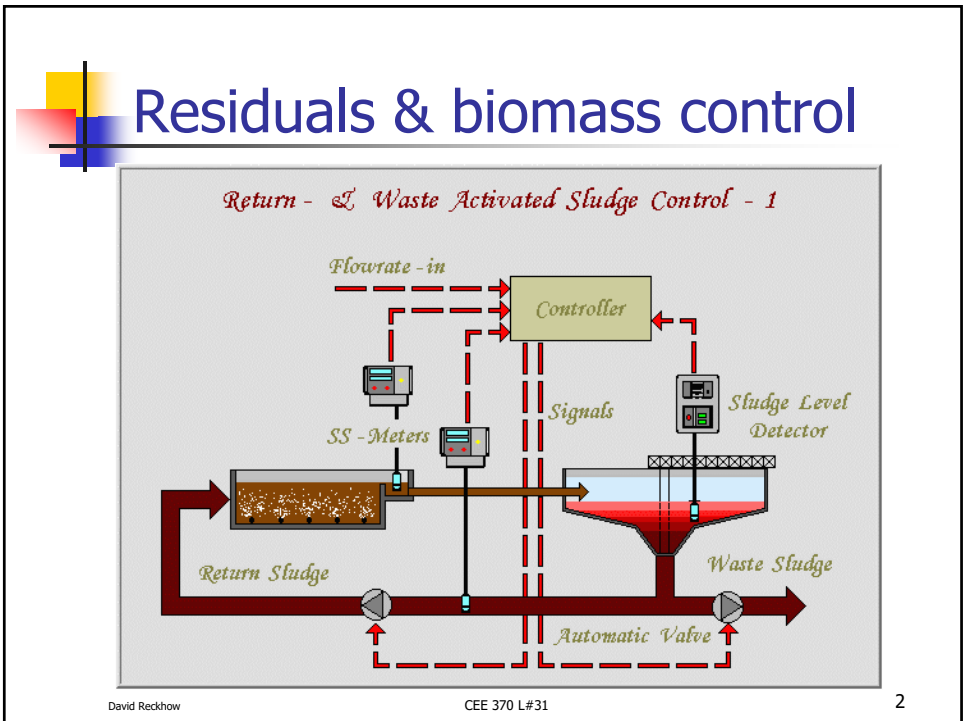
Updated: 26 November 2019 [Print version](#)

CEE 370 Environmental Engineering Principles

Lecture #31 Wastewater Treatment II: Characteristics, Growth & Process Modeling

Reading M&Z: Chapter 9
[Reading: Davis & Cornwall, Chapt 6-2 to 6-8](#)
[Reading: Davis & Masten, Chapter 11-2 to 11-7](#)

David Reckhow CEE 370 L#31 1



Clarifiers: Rectangular

The diagram illustrates the internal structure of a rectangular clarifier. On the left, the **INFLUENT** enters through an **Influent Control Gate**. A **Target Baffle** is positioned just inside the gate. At the bottom left, a **Sludge Cross Collector** and **Sludge Withdrawal Pipe** are shown. A **Sludge Collector Drive Unit** is located at the top left. Along the bottom, a **Sump** and **Wearing Shoe** are indicated. A **Main Sludge Collector** runs along the bottom right, connected to a **Sprocket**. At the top right, a **Scum skimmer** is mounted above a **Scum Trough**, which is followed by a **Scum Baffle**. **Effluent Weirs** are located at the far right, leading to an **Effluent Trough** and finally the **EFFLUENT** outlet.

RECTANGULAR CLARIFIER

David Reckhow CEE 370 L#31 3

Clarifiers: circular

The diagram illustrates the internal structure of a circular clarifier. **INFLUENT** enters through an **Influent Well** at the top center. A **Drive Unit** is located at the top center, connected to a **Vertical Drive Cage** that extends down to a **Blade and Scraper Squeegee** at the bottom. A **Skimmer Arm** is positioned at the top right, leading to a **Scum Trough** and **Scum Discharge**. **Effluent Weir Plate** is located at the top right, leading to an **Effluent Trough** and finally the **EFFLUENT** outlet. At the bottom center, a **Sump** and **Sludge Withdrawal Pipe** are shown. A **Sludge Collector Mechanism** is located at the bottom left.

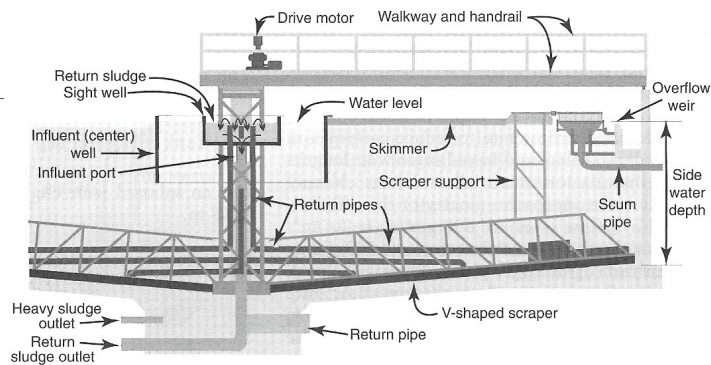
CIRCULAR CLARIFIER

David Reckhow CEE 370 L#31 4

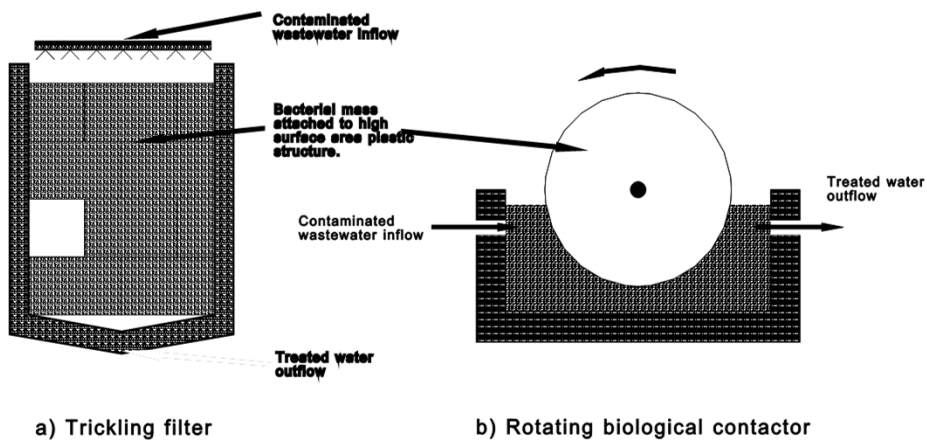
2° Settling

- Typical secondary settling tank with suction sludge withdrawal

Figure 11-17
Secondary clarifier designed for use with biological aeration. Activated sludge is withdrawn through suction pipes located along the collector arm for rapid return to the aeration basin.



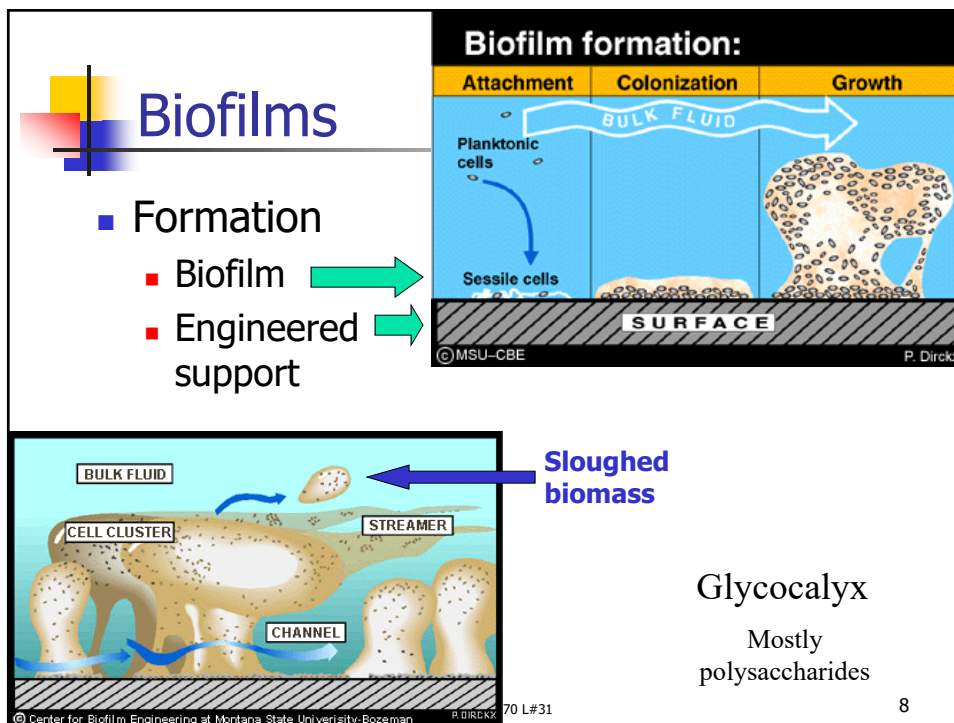
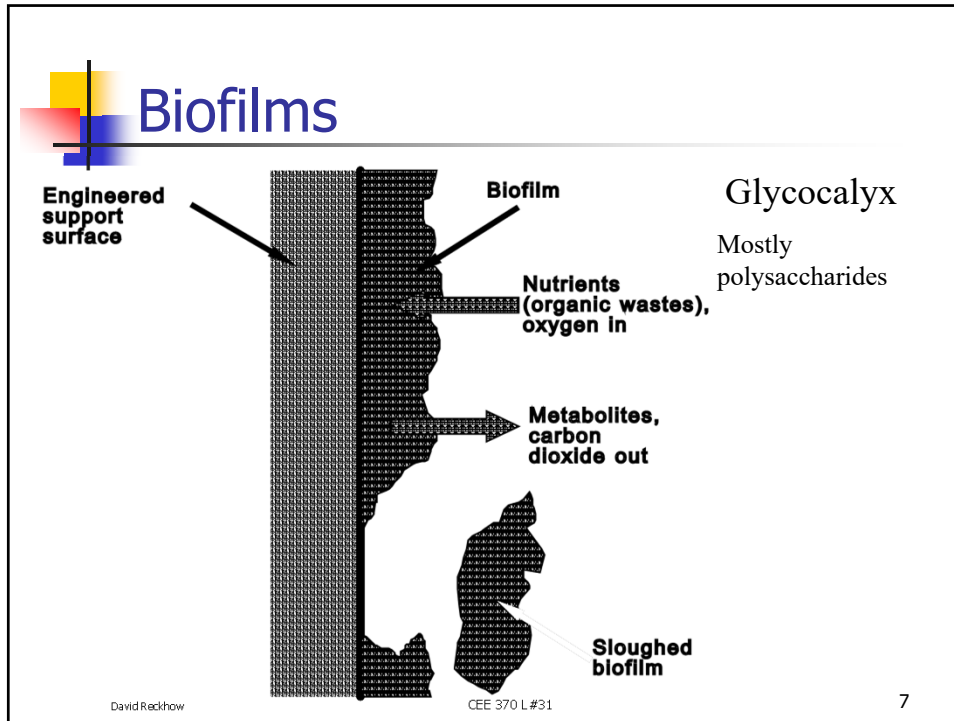
Attached Growth Processes



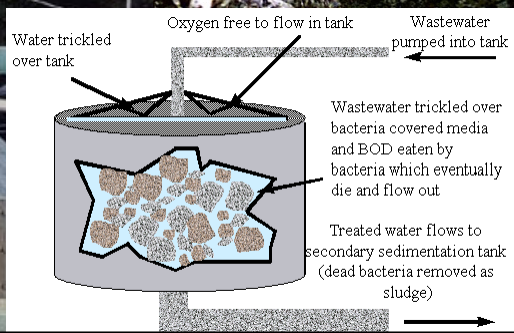

David Reckhow

CEE 370 L#31

6



Trickling Filters



Oxygen free to flow in tank

Wastewater pumped into tank

Water trickled over tank

Wastewater trickled over bacteria covered media and BOD eaten by bacteria which eventually die and flow out


Treated water flows to secondary sedimentation tank (dead bacteria removed as sludge)

RBCs

■ Marquette, MI



10



- To next lecture

David Reckhow CEE 370 L#31 11