Introductions:

- John
    - Equipment manufacture
    - Lots of wastewater treatment
        - Also reusing / cleaning stuff
        - And using wastewater to generate power
            - Anaerobic digestion my god
    - Severn water, wessex water, lots of places (not just the netherlands)
    - Also clients in industry
        - Food and beverage
            - Coke, etc.
        - Specialist manufacturer
            - Building treatment plan
    - 3-4million pound company
    - Owned by 1.5billion company
    - Lives in Cornwall
    - Mechanical engineer - helps mentor civ engineers and mechanical engineers
- Student intros

Logistics for future meetings:

- John has random availability, not constant, but good as long as we're consistent
- Possible to have face to face meetings
    - Tuesday 25th Oct John is in Bristol, meeting Civil Engineering graduates
    - Possibly good time for a face to face meeting
        - Afternoon

Real stuff:

- Focused mostly on the physical stuff
    - Manufactured in Netherlands
- UK base is figuring out what clients need
- Then lots of plumbing, wiring, groundworks, buildings
    - Various engineers
- They don't have a lot of Software people in, which is where we come in
- Might have their own 3D models
- Typical client project
    - Using bim 360
        - Cloud based project management
        - From autodesk
        - Integrates will with 3D bim software used by this dudes
        - Generate models using revit
            - An intelligent database driven 3D modelling software
        - Use other software sometimes but only sometimes
        - All based in CAD
    - Models
        - Generate terrain of sight data
            - 3D of the Topo

        - Then specifically modelled parts of the project
            - Concrete Tank
            - Steel portal frame building
            - Lots of specific equipment
            - Control room in the building
            - Also process equipment out of building
                - All on raised concrete slab
        - Revit environment knows what each piece of major equipment is
            - Great for understanding the building process, but not great for being able to run simulations on what would happen during construction, operation, etc.
            - This is what they want from us
            - 3D intelligent representation of what they want to build
            - Doesn't take in operational, maintenance, practice of it all
            - Which a digital twin brings
    - Equipment, capacity, basic things considered when designing a plant
        - With a digital twin you could run process scenarios through the 3D model
    - Past the modelling phase, might also want live control
        - Currently equipment is all managed by control software
        - But they have SCADA screens that give info about what's happening and gives an amount of live control
    - Minimum viable order
        - Simulating in the design process
        - Then look at operations - being able to see what happens as it runs
        - And then maintenance and control
    - Laser survey
        - Capturing a site as is
        - Get all the real world measurements, maybe can be used to inform a model
        - Take images at various points, can then be used to construct an image of the whole plant
        - Possibly allows a reference between model and real life
            - I.e. look at position in model in real life to fully understand it
        - Includes measurements etc.
    - Make list of questions in a spreadsheet
    - All the stuff is browser based in bim360
    - Currently working of of static models
    - Our job is to make one that isn't static
    - Also will need to turn existing stuff into 3D models
    - Focus on one area first
        - Simulating before building
        - Simulating things as built
        - Adding live view
        - Adding live control

- Lots of people trying to do this
  - Lots of the existing people
    - Autodesk, intergraph
  - Some software does buildings
  - Some software does rebar stuff
  - Not a lot about the process side of things
- I think we should do live view / control first, simulation later
- Look at what already exists
  - What can be copied, emulated, taken from / expanded upon
- CFD software is very specific
- Heat simulation tools exists
- Emissions
- Some of it is being done in company, so we might not need to cover the whole shebang ourselves, figure out new stuff, new solutions, etc.
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