The simulation approach of labor realization conditions in the era of digital tools

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I - The stakes of simulation
II - The tools
III – The simulation approach
IV - Example
V - Issues / Outlook

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• Change is part of companies’ daily live
• Change has a lasting impact on working conditions
• The impact of changes must be anticipated
• Simulation should facilitate this anticipation
## II – The tools

<table>
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<th>2D plans – sketches</th>
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<td>Volumetric models (cardboard, up to scale 1)</td>
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<td>3D Digital Simulation</td>
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<td>3D Digital Simulation (FlexSim)</td>
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**Public device 1:**
- **Ergonception**
- Aract Basse-Normandie
- 2009-2010

**Public device 2:**
- **Simul&Ception**
- Aract Basse-Normandie
- 2011-2012
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III - The simulation approach

1. Analysis of the design project
2. The diagnostic
3. Scenario writing
4. Dynamic 3D Digital Simulation
5. Deliverables to the company
- Interviews and observations:
  - **Goals** = characterize:
    - Flows
    - Process steps
    - The sequences of actions in time and space
    - The division of tasks
    - Constraints / Resources
    - The needs in work

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Scenario writing

- Define what to simulate

- Propose changes (spatial, organizationnal)

- Transmission of additional informations/data required by the 3D specialist provider
  - process time,
  - Frequency and duration of hazards,
  - Chronicles of Activity
  - Photos, movies, layout plans...

- Many informations exchanges

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Scenario writing

- Modeling the object to design (space, workstation, tasks...), from:

The current situation

Reference situation (s)

Working draft

> Links with the potentialities of the tool(s) and the complexity of the object to simulate

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Dynamic 3D Digital Simulation

- **Working groups:**

  **Goals:**
  - Testing scenarios, pre-defined in the previous phase, simulating the future activity in order to validate or invalidate them.
  - Promote the emergence of new scenarios, which will then be tested in real time (or later, depending on the potentiality of the simulation tool)

- **Group composition:**
  > Employees, management, company director (?), 3D simulation provider, ergonomist
  > + External partners: OSH Experts (Occupational physician, CARSAT, MSA...), Contractor (Architect)

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Public device « Simul&Ception »

Reorganization of a kitchen production workshop

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What are the advantages of 3D dynamic simulation?

• Time saving

• Traceability of what has been simulated to report outside the working group.

• Best way to project in the future activity (immersion)
  > fast adoption of the simulation tools
  > fast adoption of the future work station/place

• A more global approach thanks to the multiplicity of variables that can be integrated into the tools.

• Taking account of almost all the dimensions of the working conditions.

• Promotes collaborative work with future users and co-design approach.

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What are the « limits » of these digital tools ?

• Measurement of effects on productivity is easier than effects on health. Improvements are essential to bring our issues on working conditions to the top.

• Tools that can easily be used with wrong or partial data, based on prescribed work or an ideal mode.
  > A vigilance to have on the integration of data based on the real work (taking account of malfunctions ans hazards)

• Technical abilities: limited control besides the digital simulation provider
THANK YOU!

Aract NORMANDIE

http://www.normandie.aract.fr

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