

Study and design of collaborative robot system in foundry environment

Baptiste, MENGES, 2nd years Phd, CIFRE Thesis

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Aim : Improve operator working conditions

Context : Production of ductile iron pipe for water conveyance by casting machine and iron liquid (1300°C)

Operators tasks characteristic :

- Monitor, Clean, Coat, Maintain cast iron elements
- Rhythmic movements, know-how
- Take care of the environment

Foundry conditions :

- Dusts
- Heat
- Painful tasks
- Iron projections



Proposed solution :

- Development of **collaborative robot** system to interact with operator in different tasks
- Design tools to make the robotic arm able to realize the tasks :

Drop product on the channel	Air gun
Clean the channel	high pressure cleaner
Remove some dirts	Scrub Brush

- Robot's **rhythmic tasks** controlled by **neural oscillators** inspired from the human motor nervous system.
- Development of an augmented reality based operator interface to **teleoperate** the robot.

Current works :

- Technical analysis of the operator tasks to understand how the robot can realize the tasks.
- Implementation and simulation the Franka robot into Gazebo with a bio inspired robot controller to realize the operator tasks.

