***Environmental Model***

**Speed Sensor**

**Control System**

**User**

dcd

*information flows*

**BCM**

*energy flows*

**Forks**

**Turn Signal**

**Environment**

Disturbance relation

***Application Scenarios***

**1- Hydraulic system**

Situation: Hydraulic cylinder in the body and rig of the forklift, which is installed in the front masts to help the engine while lifting objects.

Intended behavior: The forks should move up or down through the lever and the monitor should show the driver the situation by the turn signals.

**2. Cruise control**

Situation: The system receives a constant speed command via a lever or key

Intended behavior: Speed must be constant and be displayed to the driver for feedback if the cruise control light is successful.

**3. Transmission system**

Situation: The forklift gearbox is part of the engine assembly that connects the engine and the wheels so that they can rotate at the same time and it is responsible for transferring engine power to the wheels

Intended behavior: Power transmission from the engine to the wheels must be done and the forklift to

**4. Acceleration**

Situation: The forklift receives a steering command by applying force to the accelerator pedal.

Intended behavior: The forklift should be moved in the desired direction by the driver and move the object.

**5. Brake**

Situation: When the operator pushes down on the brake pedal, the brake shoes press against the brake drum, creating friction, which slows down the lift truck. The forklift is driven by hydraulic oil from a pump driven by the engine to hydraulic motors at the wheels.

Intended behavior: The forklift must be stopped at the desired location and the stop light must be shown to the driver for feedback.

**6. Differential**

Situation: It is a mechanical system which control the amount of torque to be transferred to moving wheels in an automobile or a forklift truck. It consists of a number of parts such as pinion drive gear, ring gear, side/ spider gears, differential case assembly, rear drive axle & bearings and axle housing.

Intended behavior: The wheels have to spin at different speeds and both drive wheels (front or rear) have to travel different distances. This is where the differential comes into play.

**7. Traction control**

Situation: The system reduces the force coming from the engine side to prevent slipping like ABS and EBD systems.

Intended behavior: The forklift truck must prevent slipping and imbalance when moving objects, and if the traffic light is successful, the balance light will be activated to provide feedback to the driver.

**8. Final Drive:**

Intended behavior: After lifting the objects by the forks according to the mentioned steps, the cargo is placed in the desired place. In this step, all the mentioned steps are repeated.