

**ISO TC104/SC4/WG2 - N252  
Electronic Seal Verification Scenarios**

**Assumptions**

- Seal verification means ...
  - Determine the identity of a container
    - OCR
      - Person typing in the container number
      - Future: Container identification tag
  - Determine the identity, type, and status of the electronic seal on that container
  - Determination whether the seal on the container is the same as the shipper in its shipping instructions has stated it affixed to the container upon stuffing.
  - Electronic seal resolved to a specific container

**Container handling equipment scenarios**

- Assumption: Vessel discharge or load will involve one or more of the following
  - Top loaders
  - Side loader
  - Reach stacker
  - RTG - Rubber Tire Gantry
- Sub scenarios
  - RMGCs - Rail mounted gantry cranes
    - See Crane - make consistent
  - Straddle carrier
    - Spreader mounted LF and reader can be on legs or other crane parts
  - Crane
    - Without spreader mounted LF
      - Max read distance = 35m (crane), 100ft (crane rail)
      - Subtopic
- Requirements
  - Ability to resolve seal to a specific container
  - Sufficiently hardened for appropriate levels of shock and vibration
  - Minimum speed = 0km/h
  - Maximum speed = 12m/sec (-44km/h, 27mph)
  - Max read distance = 17m (55ft) (truck head to container)
- Limitations
  - Seals must be separated by 6ft (2m) to resolve to a specific container
  - Power needs to be available

**Restricted lane scenarios**

- Assumption: Covers gate moves for trucks/chassis and trains
- Sub scenarios
  - OCR portal
    - Single lane
    - Multi-lane
  - Gate
    - Unidirectional
    - Bidirectional
  - Pre-gate
  - Train gate
    - Single track
    - Multiple tracks
- Requirements
  - Ability to separate by lane
  - Minimum speed in lane = 0km/h
  - Maximum speed = 50km/h (31mph)
  - Rail cars possibly = 120km/h (75mph)
  - Lane widths of 6m
- Limitations
  - Seals must be separated by 6ft to resolve to a specific container
  - Investigate: Bottom container on double-stack train (well car)

**Open concrete patch**

- Sub scenarios
  - Pre-gate
  - Under crane
  - Quay road
- Requirements
  - Minimum speed in lane = 0km/h
  - Maximum speed = 33km/h (21mph)
  - Max read distance = 50m (164ft)
- Limitations
  - Seals cannot be resolved to a specific container

**others?**

- Topic: Opened seals (waste) in large quantities in ports.
- Topic: Recycle/dispose of electronic rules

**Long-range handheld scenarios**

- Assumption: Used to only determine seal status
- Sub scenarios: Lack of fixed infrastructure
- Requirements
  - Ergonomically viable
  - Min speed = 0km/h
  - Max speed = 12m/s (-44km/h, 27mph)
- Limitations
  - Seals cannot be resolved to a specific container
  - Limited to distances of 50m (164ft)

**Short-range handheld scenarios**

- Sub scenarios
  - Lack of fixed infrastructure
  - Exception handling
- Requirements
  - Ergonomically viable
  - Ability to resolve seal to a specific container
  - Min speed = 0km/h
  - Max speed = 5km/h (3mph)
- Limitations
  - Must have physical access within 6ft (2m) or less of the electronic seal