In the food processing industry one of the most common foreign materials found in food is metal. Metal fragments can be unintentionally introduced to food products and become a safety hazard to consumers.

**Sources of Metal Contamination:** Metal can enter the product and process from a variety of sources.
- Raw Materials including shot in meat, machine parts associated with harvesting, hooks and wire.
- Personal sources including pens, buttons, jewellery, coins, hair clips and keys.
- Maintenance tools and effectives including spanners, wrenches, screwdrivers, nuts, bolts, washers, scarf and filings.
- Processing Equipment including crushers, cutters, knifes, sieves, blenders and general machine parts and materials arising from wear and tear.

**Effect on consumers:** Metal fragments in foods may cause dental damage, lacerations of the mouth or throat, or laceration or perforation of the intestine. Some cases may even require surgery for the metal to be removed.

**Controls:**

**Supplier Control**
- A full risk assessment of suppliers and raw materials should be conducted. This can lead to criteria for the selection and monitoring of suppliers and their detection methods to ensure the burden of control does not rest solely on your final detection system.

**Machine and Equipment Design**
- Any new item of equipment should be fully assessed for unreasonable risk of metal contamination of product. Utensils should be capable of withstanding robust use without breakage.
- There should be maintenance programs in place that are designed to ensure equipment remains in an acceptable state of repair.

**Removal System**
- Magnets and Sieves.

**Knives and Sharps Control**
- There should be a system in place for items including: a register, an issue and reconciliation record, integrity check and control procedures in the event of damage.

**End of Line Inspection**
- Metal Detection or X rays
Recall of product due to metal found

<table>
<thead>
<tr>
<th>What</th>
<th>When</th>
<th>Why</th>
</tr>
</thead>
<tbody>
<tr>
<td>242,000 cases of Kraft Macaroni and Cheese</td>
<td>2015</td>
<td>Product may have contained metal shards</td>
</tr>
<tr>
<td>59 Pastry products recalled by Addo Food Group</td>
<td>2018</td>
<td>Possible presence of small pieces of metal wire</td>
</tr>
<tr>
<td>Tyson Foods recalled 1.8 million pounds of Frozen chicken strips</td>
<td>2019</td>
<td>Six people complained of finding metal pieces in the product with 3 suffering injuries to their mouth</td>
</tr>
</tbody>
</table>

Types of Metal Detectors

Conveyor Mounted :: Usually located at the end of the line. A continuous conveyor runs through the aperture carrying the product packs or units. Each is checked individually and rejected if metal is detected. The sensitivity of the detection head is important in determining the type and size of metal pieces detected.

Vertical Packaging Systems :: In this format there is a throat metal detector and a bag former underneath. They are normally used for certain flowing products.

## SUMMARY TABLE

### Sources
- Raw Materials, Personnel, Maintenance Tools, Processing Equipment

### Effects
- Lacerations, Dental damage

### Controls
- Supplier Control, Equipment Design, Removal Systems

### Published Risk Assessments

### References