

Technical Information Bulletin



U.S. Department of Labor
Occupational Safety and Health Administration

Potential Ejection Hazard Associated with High Speed Separators in Rendering Operations

TIB 01-06-20

Purpose

The purpose of this Technical Information Bulletin is to provide employers and employees who operate, service, and maintain high speed separators with information about the potential for ejection of machine parts during operation, if not properly assembled, operated, inspected and maintained.

Background

The Wichita Area Office brought to the attention of the Directorate of Technical Support a fatality investigation conducted in the rendering department of a beef processing facility. In the accident, the rendering operator sustained fatal injuries and another employee suffered non-fatal injuries when they were struck by flying parts ejected from a high speed separator.

Incident Description

The high speed separator (see Figure 1), located in the rendering department of a beef processing plant, was used to separate water, solids, and tallow. Purified tallow was the desired end product. The separator had not been running properly on the day before the accident. The operators and maintenance employees disassembled and reassembled the machine two or three times in an effort to get the machine to properly “run product.” (Disassembly of the machine requires removal of the frame hood, coupling ring, and bowl assembly. When the machine is reassembled, the bowl assembly is held together by the coupling ring, which threads into the separator bowl body. The coupling ring and all the bowl assembly parts have alignment marks to ensure that the parts are correctly placed. According to the manufacturer’s instructions, in the event of excessive

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thread wear, which is indicated when the coupling ring is tightened and the alignment mark on the coupling ring exceeds the alignment mark on the bowl bottom by 25 degrees or more, the manufacturer should be contacted immediately because this situation indicates excessive wear of the bowl threads, a condition that is dangerous to users and may damage the equipment. The manufacturer’s instructions also warn that the user should check for thread wear periodically, since thread wear is not always related to a rough running bowl.)

On the day of the accident, the operator had just reassembled the machine. After various parts were replaced (it is not known whether the alignment mark on the coupling ring was properly aligned with the mark on the bowl bottom), the separator was started and was running for approximately 5-6 minutes when the frame hood and the parts from the bowl assembly were ejected from the machine, striking the operator and a maintenance employee. The operator, who apparently was adjusting the feed rate, was struck in the head and upper chest and was fatally injured. It is believed that the separator was at or near its full

operational speed of 4,500 rpm at the time of the accident. According to the maintenance employee, just prior to the ejection the separator appeared to be running smoothly, with no visual or tactile indication of vibration; the maintenance employee did not detect any vibration when he placed his hand on the machine.

Recommendations

High speed separators, if not properly assembled, operated, and maintained, may forcefully eject separator parts, exposing employees in the area to hazards associated with flying objects.

OSHA makes the following recommendations to employers and/or workplace users of high speed separators:

1. Establish an overall mechanical integrity program, including a preventive maintenance program to maintain the on-going integrity of the process equipment. Perform routine, thorough inspections of the machine and bowl assembly. These inspections are

to be performed by qualified individuals who have received appropriate training and who are familiar with manufacturer instructions and recommendations. To ensure safe operation of the high speed separator, all machine parts must be carefully inspected on a routine basis for excessive wear, with particular attention given to coupling ring wear, to confirm that all parts are within tolerances outlined by the manufacturer and consistent with good engineering practice. Inspections should be documented and routinely reviewed by management to ensure they are being properly and regularly performed and that timely corrective actions are taken. Immediately correct any deficiencies outside of the manufacturer's acceptable limits for the equipment. Contact the manufacturer or other qualified individuals who have received appropriate training and who are familiar with manufacturer instructions and recommendations with any questions concerning acceptable

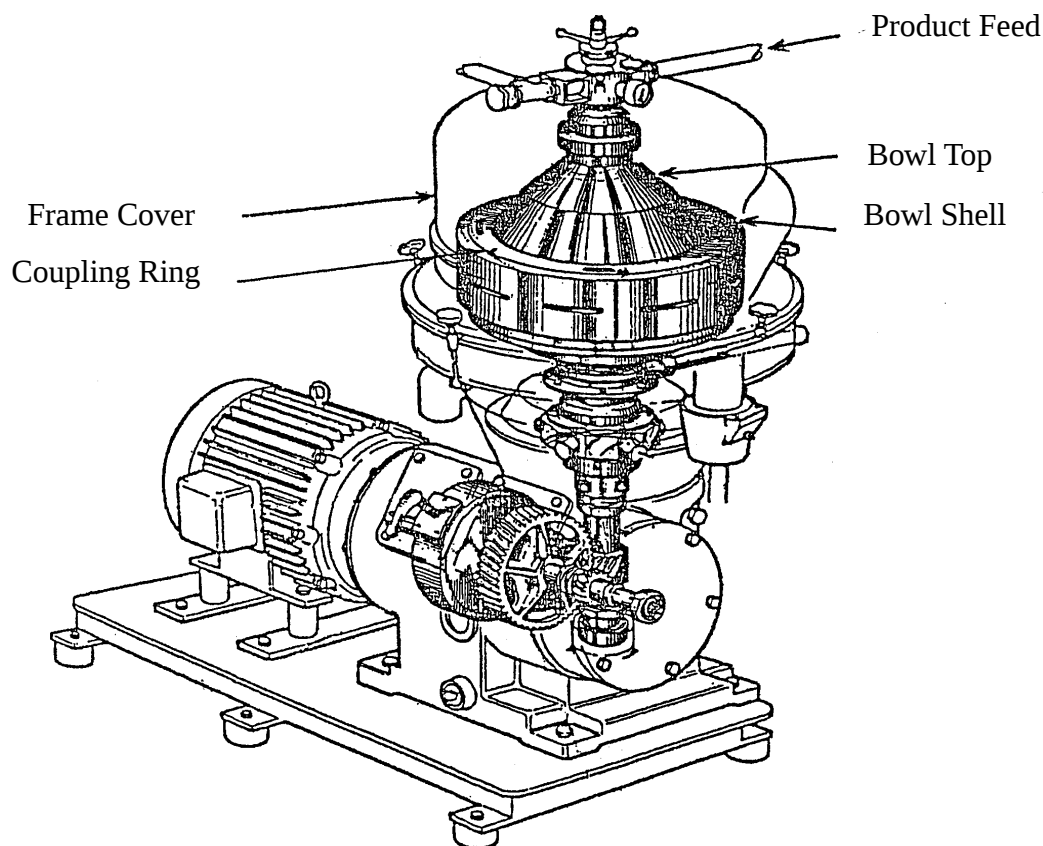


Figure 1 - High Speed Separator

tolerances or to obtain assistance in determining whether separator parts are excessively worn. Non-destructive testing may be a useful method to detect mechanical integrity deficiencies in equipment. The type and frequency of inspections and tests must be consistent with the manufacturer's instruction, good engineering practice, and operational needs, as determined by prior operating experience.

2. Ensure that any vibration detection/monitoring system in use on the separator is functioning properly when the separator is in operation. Maintain, calibrate, and test each piece of equipment in accordance with established mechanical integrity procedures, manufacturer's instructions and recommendations and good engineering practices.
3. Ensure that employee training provides a complete explanation of the operation and maintenance of the separator, including: assembly, disassembly, inspection of the condition of the separator and its component parts (including the bowl assembly parts), routine maintenance needed, and potential safety hazards associated with incorrect assembly, lack of proper maintenance, inadequate inspection of the condition of the separator parts or improper use of the separator, in accordance with the manufacturer's instructions or recommendations. Provide training for non-English speaking workers who are unable to read the operator's manual in English.
4. Develop and implement written operating procedures to provide clear instructions for safely conducting separator activities. These procedures should address, at a minimum, the following:
 - steps for each operating phase (startup; normal operations; emergency and normal shutdowns);
 - safe operating limits, including the consequences of deviations and steps required to correct or avoid deviation; and
 - description of separator components (e.g., pressure regulators; relief valves; vibration detection/monitoring equipment; water control valves), their functions, and safe work practices (e.g., mechanical integrity procedures, including the separator assembly and disassembly safety instructions; prohibition of work in a trajectory zone).

5. Ensure that the man-machine (ergonomic) interface is considered and incorporated into the separator operations to ensure that employees remain safely outside the trajectory/projectile zone danger areas while performing tasks. For example, ensure that the location of the product feed control valve relative to the separator equipment eliminates the need for employees to be in the dangerous trajectory/projectile zone during operation of the separator.

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Important Information on the Nature and Effect of Technical Information Bulletins

OSHA's Directorate of Technical Support (DTS) issues Technical Information Bulletins (TIBs) to provide information about occupational hazards and /or to provide information about noteworthy, innovative, or specialized procedures, practices and research that relate to occupational safety and health. DTS selects topics for TIBs from recognized scientific, industrial hygiene, labor, industry, engineering, and/or medical sources.

The *Occupational Safety and Health Act* requires employers to comply with hazard-specific safety and health standards. In addition, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm under Section 5(a)(1), the General Duty Clause of the Act. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take appropriate steps to prevent or abate the hazard. However, the failure to implement TIB recommendations is not, in itself, a violation of the General Duty Clause. Citations can only be based on violation of standards, regulations, and the General Duty Clause.

Further information about this bulletin may be obtained by contacting OSHA's Directorate of Technical Support at 202-693-2300