Feasability study on BHPB still image

Purpose: Can computer vision detect bone hangups "pancakes" on the tooling ?

Test program by Rich Budek 01/12/2021

BACKGROUND

Customer's rotary compression molding machine is having hangups or "pancakes". Five years ago, a digital height gauge system was installed to measure the height of mold set after compression. If there was excess material, then the system would detect this by seeing a lower height. That is, the top plate would be closer to the sensor face, which was aimed down. Thus, the top plate was up higher than during a normal run. This method required permanent brackets and wiring to accomplish this. This wiring and brackets were removed during a machine rebuild and no longer available.

Today, the question is, "Can computer vision be used on a movie sequence, either real-time or on a file, to determine which stations are having hangups ?". Of course, if detection is possible then data could be collected, stored, and used for a design of experiments test. Using a computer vision system could be as easy as being a hand held mobile device or just a camera. Both could be externally mounted quite easily.

Evaluating the motion could be done real-time while the machine is in motion, or have the motion be saved in a MPEG movie file and processed at a later time.

This report is based on a movie recorded from a handheld Android mobile phone. The following is the output generated by a test program running fully automatic on an image. The program attempts to determine if there is a hangup by locating the mold plate within the frame and then looking for product left hanging in the plate. Depending on the set limit for amount of bone material, the program determines if it is "bad" or "good".

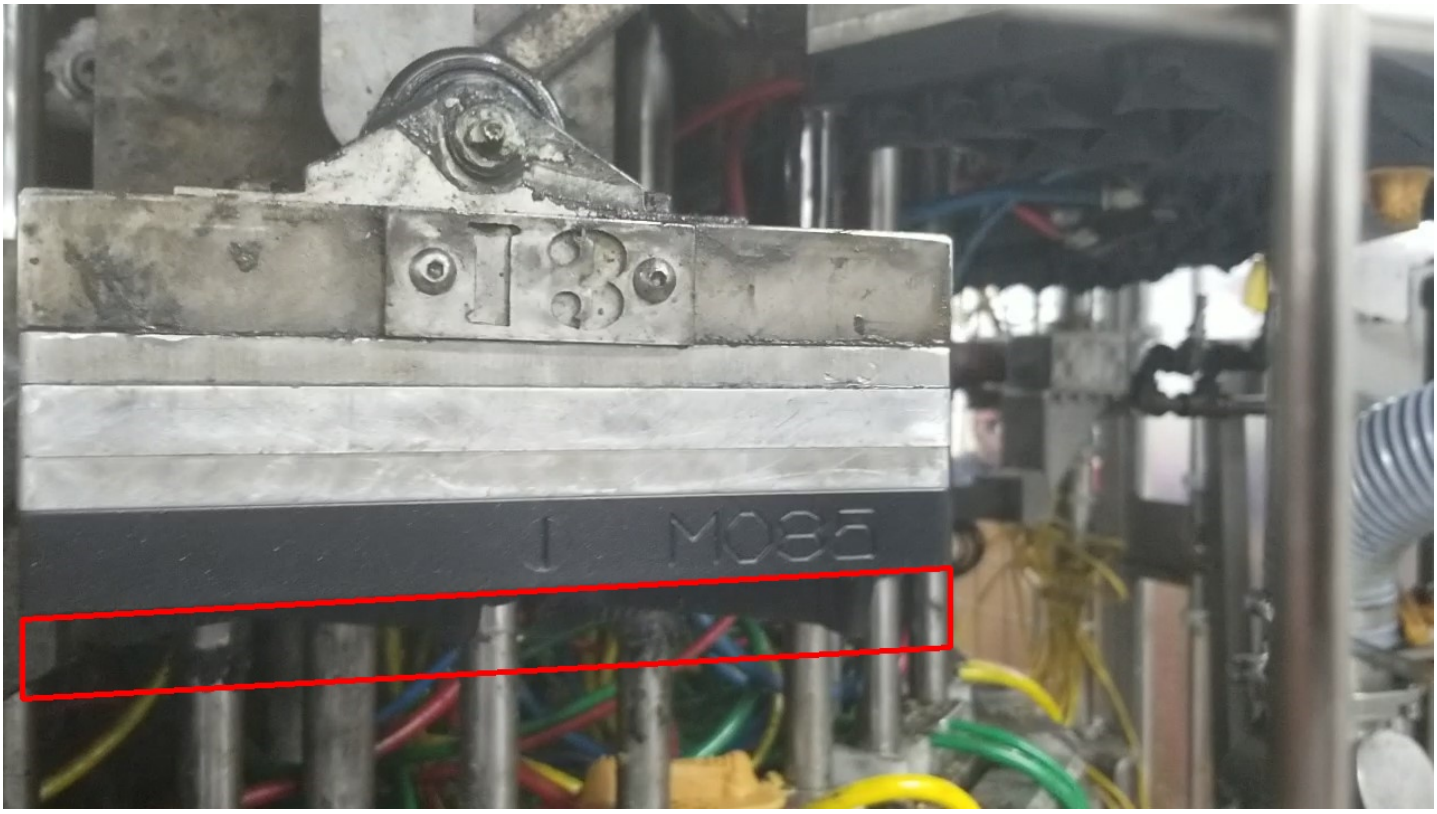
title	Mini Twisted Bones
descrip	production run 2020
data file	NoDefect_01.jpg
size	150 KB
date	07/20/2020
pixel size	1280 x 720
operator	Rich Budek
search box	
UL	17 , 550
LR	847 , 575

ORIGINAL PICTURE

This is the original picture without any markups. It is a single frame extracted from a movie file.
Original movie was shot on handheld android phone.

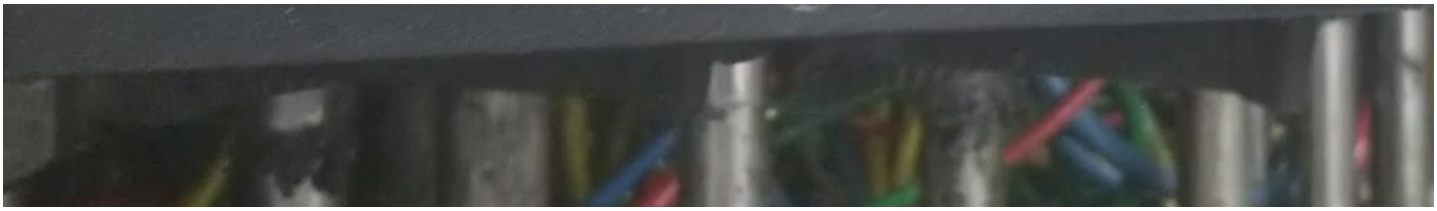
WITH SEARCH WINDOW

Highlighted in red is the intended search area. We will be looking for bone material.



SEARCH WINDOW

Just the search window zoomed in.



SEARCH WINDOW CLEANED UP

If the search area is on an angle, then turn pixels to white for anything outside the box.

DEFECTS FOUND

All of the bone material found.

RESULT

Was the bone good or bad ? Picture gives the result

GOOD