

Indiana University – Purdue University Fort Wayne
Opus: Research & Creativity at IPFW

Manufacturing & Construction Engineering
Technology and Interior Design Senior Design
Projects

School of Engineering, Technology and Computer
Science Design Projects

4-22-1980

Automatic Can Crusher

Mark R. Landis

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/etcs_seniorproj_mcetid

Opus Citation

Mark R. Landis (1980). Automatic Can Crusher.
http://opus.ipfw.edu/etcs_seniorproj_mcetid/163

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Manufacturing & Construction Engineering Technology and Interior Design Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.

A U T O M A T I C C A N

C R U S H E R

Designed

by

Mark R. Landis

In Partial
Fulfillment of
the Course
Objectives of

MET 497

Senior Project

April 22, 1980

AUTOMATIC CAN CRUSHER

TABLE OF CONTENTS

| | |
|---|-----|
| LETTER OF TRANSMITTAL. | i |
| ABSTRACT | ii |
| I. OBJECTIVE. | 1 |
| II. INTRODUCTION | 2 |
| III. CRITERIA | 4 |
| IV. DESIGN SOLUTION. | 5 |
| A. General Description. | 5 |
| B. Preliminary Analysis | .12 |
| C. Computer Program | .16 |
| D. Material | .18 |
| V. FABRICATION. | .20 |
| A. Full Scale vs. Mock-up | .20 |
| B. Facilities | .21 |
| C. Cost Data. | .22 |
| VI. TESTING PROCEDURES | .24 |
| A. Test Objectives and Methodology. | .24 |
| B. Testing Equipment. | .25 |
| C. Test Data. | .25 |
| D. Test Evaluation. | .26 |
| VII. SUMMARY. | .27 |

ABSTRACT

Aluminum cans create a lot of problems in America. A machine has been designed to make recycling practicable. The machine was designed with a large hopper to hold a lot of cans. These cans are then fed by hand into a chute which holds about 25 cans. The cans are then crushed individually by a $3\frac{1}{2}$ inch cylinder powered by air pressure at a maximum of 60 psi. The crushed can is then rejected by a 1 inch cylinder. Cycling of the cylinders is automatic by the use of solenoid valves and a complex electrical circuit. The crushing cylinder produces 577 pounds of force. With this force, stress calculations were made on critical members. The $\frac{1}{4}$ inch bolts had a shear stress of 5,333 psi. The mounting plate had a bending stress of 17,725 psi, as well as a .4 inch deflection at the top of the plate. A computer program was run to determine the cycles per minute for any given pressure. Fabrication of the mock-up machine was by careful machining of parts and assembly. In full scale production, machining of parts would be semi-automatic, with several subassembly operations. The cost of the mock-up was \$477. Testing of the machine was by operating it using a large number of cans. Visual inspection was all that was required.