

TABLE OF CONTENTS

	Page
CHAPTER	
1. INTRODUCTION	1
1.1 Purpose	1
1.2 Organization of Thesis	2
2. MATERIAL DESCRIPTION	4
2.1 Material Specification and Test Pattern Development	4
2.1.1 Material Specification	4
2.1.2 Test Pattern Development	4
2.2 Material Preparation	7
2.2.1 Coldworking Process	7
2.2.2 Specimen Preparation	17
3. EXPERIMENTAL PROCEDURES	21
3.1 Moiré Method of Strain Analysis	21
3.1.1 Application of Moiré Analysis	21
3.1.2 Moiré Technique	21
3.1.3 Specimen Grating Production	27
3.1.4 Specimen Grating Photography	31
3.2 Optical Data Processing System	34
3.2.1 Coherent Optical Data Processing	34
3.2.2 Diffraction by Superimposed Gratings	34
3.2.3 Coherent Optical Fourier Data Processing	42
3.2.4 Moiré Fringe Pattern Photography	43
4. METHODS OF ANALYSIS AND PRESENTATION OF TYPICAL RESULTS	46
4.1 Labeling System	46
4.2 Typical Fringe Patterns	49
4.3 Data Reduction	52
4.4 Digitizing of Data Photographs	53

CHAPTER	Page
5. EXPERIMENTAL RESULTS AND CONCLUSIONS	58
5.1 Coldworking Two Hole In-Line Fasteners	59
5.1.1 Introduction	59
5.1.2 Experimental Results	59
5.1.3 Conclusion	74
5.2 Nonconsecutive Coldworking of In-Line Fasteners	75
5.2.1 Introduction	75
5.2.2 Experimental Results	75
5.2.3 Conclusion	85
5.3 Consecutive Coldworking of In-Line Fasteners	88
5.3.1 Introduction	88
5.3.2 Experimental Results	88
5.3.3 Conclusion	102
5.4 Inter-row Influence of Coldworking	109
5.4.1 Introduction	109
5.4.2 Experimental Results	113
5.4.3 Conclusion	117
5.5 General Conclusions	117
5.6 Future Research	121
REFERENCES	123