TRAINING PARTICIPANT'S WORKBOOK
2-2-1-1

AA FIGURE CONSTRUCTION:
UNIT 1: AN INTRODUCTION

SERIES 2: MAPO TRAINING

PROGRAM 2: AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

MODULE 1: LARGE HUMAN TYPE FIGURES

UNIT 1: AN INTRODUCTION

TECHNICAL TRAINING

PARTICIPANT'S WORKBOOK

Produced by the

Video Production Unit

WED Enterprises

April 1981

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

TO THE PARTICIPANT

ABOUT THIS TRAINING

The training information you are about to receive has been specially structured to make your learning experience interesting, efficient, and successful.

To help you learn the information in a way most compatible with your personal learning abilities, a combination of instructional presentation methods has been employed.

This combination consists of presenting the information using videotapes. These videotapes demonstrate, using live action and color, the skills and procedures you are learning about. This live action allows you to see exactly how to perform a procedure, in a step by step fashion. To accompany and support the videotape presentation, you have been provided with this Workbook. This contains review, and in some cases practice, exercises which you complete. These are intended to be devices for you to evaluate your progress through the training program---they are NOT to be considered as tests.

Another item which will help you is the Videotape Index, located in this front portion of the Workbook. This provides a break-down of the information contained on the Videotape which is correlated to the "Videotape Counter Number". To locate specific information on the videotape, all you have to do is identify the counter number and

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

These three items, the videotape, the workbook, and the videotape index, combine into an audio-visual training program which you will interact with.

WHAT DOES INTERACT MEAN?

By interact, we mean that you work with the training program at your own speed, or pace that you set for yourself. After watching the videotape, you turn to the Workbook to work on the Review and Practice Exercises provided. These exericses are arranged in groups. Each group corresponds to a portion of the videotape. In most cases, each section of questions will relate to one quarter of the videotape. So, Review Exercies #1 covers the first quarter of information presented on the videotape, #2 covers the second quarter, and so on.

After you finish watching the videotape, begin doing the first Review Exercise. If you have any difficulty answering the questions, or if you want to review some of the information on the tape, consult the Videotape Index to determine the counter numbers for the information on Review Exercise #1, and wind the videotape to that number.

When you have finished each exercise, turn to the foldout answer key to check your answers. Work on each exercise until you have mastered all the information in each section. You may take your time doing this. Remember the goal is for you to master all of the

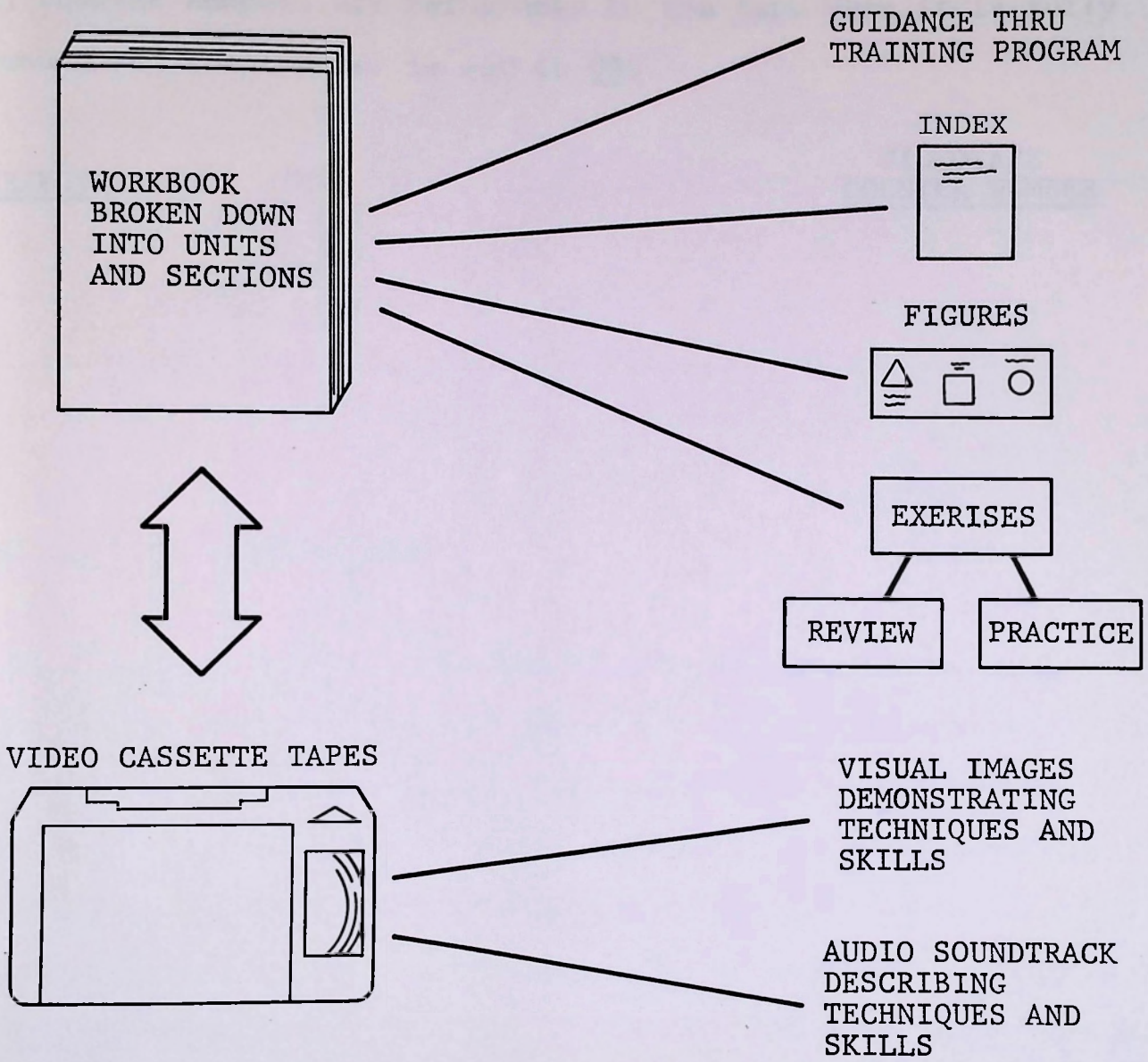


Figure 1. Components of the Training Program

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

TRAINING PACKAGE INDEX

All counter numbers are referenced to the tape when it is fully rewound and the counter is set to 000.

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION TRAINING PACKAGE

This Training Package was developed by the WED Video Production Unit for participants who will be tasked with constructing and maintaining the various types of Audio-Animatronics Figures featured on-stage at the Disney Theme Parks. This Package begins with the description of what Audio-Animatronics Figures are, provides a brief explanation on how they function, and then describes the components and procedures used to create one of these unique creatures.

YOUR TASK AS A PARTICIPANT

As stated earlier, this Training Package has been designed to help you learn the skills and procedures necessary to perform your job. Your primary task in this training is to work with the materials at a pace that is most comfortable to you. Learning the material is our goal as well as yours. Take your time going thorough all sections of information. Rewind the videotape whenever you feel unsure of the material, and use the Review and Practice exercises as intended -- for YOUR benefit and information.

After you have completed the portion or portions of this Training Package required for you to learn your job skills, refer to the end of this workbook. There you will find a set of evaluation questions concerning the Training Package. Your answers to these

This is Program 1, AUDIO-ANIMATRONICS FIGURE CONSTRUCTION. You are to begin with Module 1: Large Human Type Figures, and go through Unit 1: An Introduction.

To complete this module there are certain materials you must use. They are:

- o This workbook
- o A videocassette playback unit
- o Videocassettes for Module 1, tapes number 1 through ____

Make sure you have all these items at your disposal before beginning this unit.

The Videotape Index at the beginning of this Workbook will tell you where specific information is located on the videocassette. Use this index to review the discussion of each section in the Workbook if necessary.

To begin, insert Tape number 1 into the Videocassette Playback Unit. Start the Playback Unit, and watch the presentation. Then you should return to this Workbook to complete Review and Practice Exercises.

> Now, insert Videocassette Tape #1 of 1 into the Videocassette Playback Unit. Turn on the unit and verify that the tape is completely rewound. Set the tape counter to 000 and proceed with the instructional material.

PLACE AN "X" ON THE APPROPRIATE LINE TO INDICATE WHETHER THE STATEMENT IS TRUE OR FALSE.

1. The term "Audio-Animatronics" actually refers to the total integrated network that Disney uses to support and implement Audio-Animatronics presentations.

   _____ True

   _____ False

MATCH THE ITEMS ON THE LEFT WITH THE DESCRIPTIVE STATEMENTS ON THE RIGHT. THERE MAY BE MORE THAN ONE DESCRIPTIVE STATEMENT FOR EACH ITEM.

2. There are several types of Audio-Animatronics figures. Match the category numbers on the left with the descriptive names on the right.

_____A. A1 figures	a. Small oil
_____B. A2 figures	b. Large oil
_____C. A6 figures	c. Small World Figures
_____D. Doll Type	d. Large air
	e. Human type
	f. Pneumatic
	g. Hydraulic

MARK THE LETTER(S) THAT IDENTIFY THE CORRECT ANSWER. THERE MAY BE MORE THAN ONE CORRECT ANSWER FOR EACH STATEMENT.

3. There are many steps in the "Imagineering" process of Audio-Animatronics figure design and construction. MAPO personnel participate in which of the stages listed below?

   _____ A. Idea and Sketch Stage

   _____ B. Maquette Production

   _____ C. Formation of the Body Shell

   _____ D. Creation of the Mechanical Assembly

CHECK YOUR ANSWERS WITH THE ANSWER KEY THAT FOLLOWS

1. True

2.- A. b, e, g

- B. a, e, g

- C. d, e, f

- D. c, f

3. C, D

REVIEW EXERCISE #2

PLACE AN "X" ON THE APPROPRIATE LINE TO INDICATE WHETHER THE STATEMENT IS TRUE OR FALSE.

1. The mechanical assembly components provide skeletal structural support for the body shell and the means to animate the figure.

   _____ True

   _____ False

2. The butyrate body shell is composed of separate fitted pieces, and is attached to the internal mechanical assembly with brackets.

   _____ True

   _____ False

MARK THE LETTER(S) THAT IDENTIFY THE CORRECT ANSWER. THERE MAY BE MORE THAN ONE CORRECT ANSWER FOR EACH STATEMENT.

3. The separate functions of an Audio-Animatronics figure:

   _____ A. Are programmed to operate together to create fluid movement

   _____ B. Are selected from more than 50 standard figure functions, and a number of non-standard functions

   _____ C. Result from a directional force applied by an actuator

   _____ D. Are capable of being combined and controlled by one actuator

4. Actuators:

   _____ A. Are devices capable of extending or retracting, or rotating

   _____ B. Are capable of functioning in only a digital or an analog manner

   _____ C. Are driven by hydraulic or pneumatic pressure from the fluid system

   _____ D. Are controlled by electronic signals

CONTINUE TO NEXT PAGE

REVIEW EXERCISE #2

5. Actuator movement is the result of hydraulic or pneumatic pressure:

_____ A. Forcing pistons back and forth in a linear manner

_____ B. Forcing vanes to turn in a rotary manner

_____ C. Coming through fluid system lines routed to each actuator, through the figure

_____ D. Controlled by valves which respond to electronic signals

6. Control valves:

_____ A. Control the flow of hydraulic or pneumatic fluid through the fluid system lines

_____ B. Are located near the figure, usually on a valve rack

_____ C. Operate according to signals from the audio animatronics electronics system

_____ D. Are located in the Remote Terminal Unit

CHECK YOUR ANSWERS WITH THE ANSWER KEY THAT FOLLOWS

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

ANSWER KEY FOR

REVIEW EXERCISE #2

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

ANSWER KEY FOR

REVIEW EXERCISE #1

1. True

2. True

3. A, B, C

4. A, B, C

5. A, B, C, D

6. A, B, C

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

UNIT ONE: INTRODUCTION

REVIEW EXERCISE #3

PLACE AN "X" ON THE APPROPRIATE LINE TO INDICATE WHETHER THE STATEMENT IS TRUE OR FALSE.

1. Solenoid valves are always pneumatic, and control only digital functions.

   _____ True

   _____ False

2. Servo valves can be either pneumatic or hydraulic, and control only analog functions.

   _____ True

   _____ False

MARK THE LETTER(S) THAT IDENTIFY THE CORRECT ANSWER. THERE MAY BE MORE THAN ONE CORRECT ANSWER FOR EACH STATEMENT.

3. Which type of valve controls a digital--on or off--function?

   _____ A. Servo

   _____ B. Analog

   _____ C. Solenoid

   _____ D. Remote

4. Which type of valve controls an analog--varying--function?

   _____ A. Solenoid

   _____ B. Digital

   _____ C. Pneumatic

   _____ D. Servo

CONTINUE TO NEXT PAGE

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

UNIT ONE: INTRODUCTION

REVIEW EXERCISE #3

5. A transducer is attached to the actuator to sense the exact physical position of the actuator in which type of feedback monitoring?

_____ A. Electrical

_____ B. Internal

_____ C. Mechanical

_____ D. RTU

6. The actuator's control valve is built into the actuator housing, and actuator movement is monitored by an internal link to this valve in which type of feedback monitoring?

_____ A. Electrical

_____ B. Internal

_____ C. Mechanical

_____ D. RTU

ANSWER KEY FOR

REVIEW EXERCISE #3

1. True
2. True
3. C
4. D
5. A
6. C

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

UNIT ONE: INTRODUCTION

REVIEW EXERCISE #4

MARK THE LETTER(S) THAT IDENTIFY THE CORRECT ANSWER. THERE MAY BE MORE THAN ONE CORRECT ANSWER FOR EACH STATEMENT.

1. The Base Mounting Stand houses the actuators and mechanism used to animate the three major body functions which are:

   _____ A. Head turn

   _____ B. Body sidesway

   _____ C. Arm swing

   _____ D. Body twist

   _____ E. Body foresway

2. If a figure is mounted on a Base Mounting Stand, usually the left leg tube is attached to a pivot point at the top of the stand, and the other leg tube:

   _____ A. Passes through a gimbeled bearing and connects to an actuator assembly

   _____ B. Is solidly mounted for support

   _____ C. Transmits actuator movement to the pelvis, causing body movement

   _____ D. Is attached to a prop instead of the Base Mounting Stand

3. Figure movements are made to appear as realistic as possible by:

   _____ A. Aligning the figure using several major pivot points

   _____ B. Observing the movements of fellow workers in the assembly area

   _____ C. Assembling a figure in "show lighting."

   _____ D. Determining which movements are analog and which are digital

AUDIO-ANIMATRONICS FIGURE CONSTRUCTION

UNIT ONE: INTRODUCTION

REVIEW EXERCISE #4

4. On hydraulic figures, neck turns are implemented by a:

_____ A. Bell crank and linear actuator arrangement

_____ B. ROTAC (Hydraulic rotary actuator)

_____ C. Lever and linear actuator arrangement

_____ D. Servo control valve

5. When starting to construct an Audio-Animatronics figure, the first step to perform is:

_____ A. Inspect the body shell

_____ B. Make up the parts list

_____ C. Obtain the parts

_____ D. Obtain work tools

FILL IN THE BLANKS

6. There are several major sources of information which help to properly construct an audio animatronics figure. Write four of these sources in the blanks below.

_____ _____

_____ _____

AUDIO ANIMATRONICS FIGURE CONSTRUCTION

ANSWER KEY FOR

REVIEW EXERCISE #4

1. B, D, E

2. A, C

3. A, B

4. B

5. A

6. DESIGNER

STANDARD PARTS CATALOG

ASSEMBLY MANUAL

JOB TRAVEL PACKAGE

JOB TRAVEL CARD

FIGURE ANIMATION SHEET

SAMPLE ILLUSTRATIONS
AND PHOTOGRAPHS

AUDIO-ANIMATRONIC FIGURES

STANDARD FUNCTION ABBREVIATIONS

HUMAN TYPE FIGURES

FUNCTION NO.	NAME	CODE
1	Mouth	M
2	Head Nod	HN
3	Head Turn	HT
4	Head Tilt	HTLT
5	Rt. Arm Forward	RAF
6	Rt. Arm Out	RAO
7	Rt. Arm Swing	RAS
8	Rt. Elbow	RE
9	Left Arm Forward	LAF
0	Left Arm Out	LAO
1	Left Arm Swing	LAS
2	Left Elbow	LE
3	Rt. Wrist In & Out	RWIO
4	Rt. Wrist Forward & Back	RWFB
5	Rt. Wrist Twist	RWT
6	Left Wrist In & Out	LWIO
7	Left Wrist Forward & Back	LWFB
8	Left Wrist Twist	LWT
9	Torso Forebend	TF
0	Torso Sidebend	TS
1	Torso Twist	TT
2	Pelvis	P
3	Body Side Sway	BS
4	Body Twist	BT
5	Body Foresway	BF

FUNCTION NO.	NAME	CODE
26	Knee Bend	KB
27	Chair Move	C
28	Right Thumb	RT
29	Right Forefinger	RF
30	Right Middle	RM
31	Right Ring	RR
32	Right Little	RL
33	Left Thumb	LT
34	Left Forefinger	LF
35	Left Middle	LM
36	Left Ring	LR
37	Left Little	LL
	HEAD FUNCTION	
38	Eye Blink	EB
39	Eye Right	ER
40	Eye Left	EL
41	Mouth Pinch Right	MPR
42	Mouth Pinch Left	MPL
43	Smile Right	SR
44	Smile Left	SL
45	Frown Left	FL
46	Frown Right	FR
47	Eyebrow Raise Right	ERR
48	Eyebrow Raise Left	ERL
49	F - Sound	FS
50	Foot Tap	FT

AUDIO-ANIMATRONIC FIGURES

STANDARD FUNCTION ABBREVIATIONS

ANIMAL/BIRD/SEA CREATURE FIGURES & ELECTRICAL

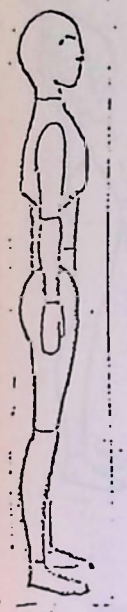
FUNCTION NO.	NAME	CODE
	ANIMALS	
51	Neck Raise	NR
52	Neck Turn	NT
53	Tail	T
54	Left Ear	EL
55	Right Ear	ER
	BIRDS	
56	Beak or Mouth	B or M
57	Head Nod	HN
58	Head Rotate Right	HRR
59	Head Rotate Left	HRL
60	Chest Out	CO
61	Body Back or Up	BB
62	Wing Flip	WF
63	Tail Flip	TF
64		
65		
66		
67		
68		
69		
70	ELECTRICAL	
71	Lighting Digital	
	Lighting Analog	

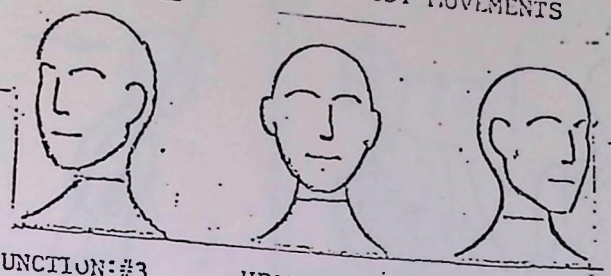
FUNCTION NO.	NAME	CODE
	ELECTRICAL	
72	Speaker Switching	
73	Relay Coil	
74	Relay, Solid State	
75		
76		
77		
78		
79		
	SEA CREATURES	
80	Right Claw	
81	Left Claw	
82	Right Pincher	
83	Left Pincher	
84	Right Front Flipper	
85	Left Front Flipper	
86	Right Rear Flipper	
87	Left Rear Flipper	

NOTE: Any special functions will be labeled S1, S2, etc.

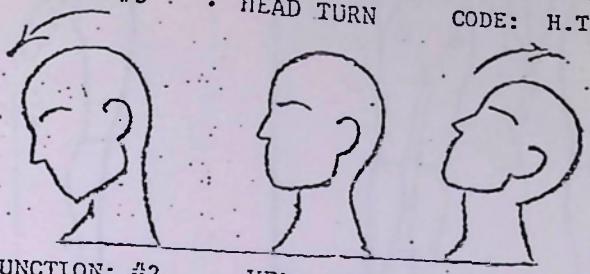
FOR

AUDIO ANIMATRONIC BODY MOVEMENTS

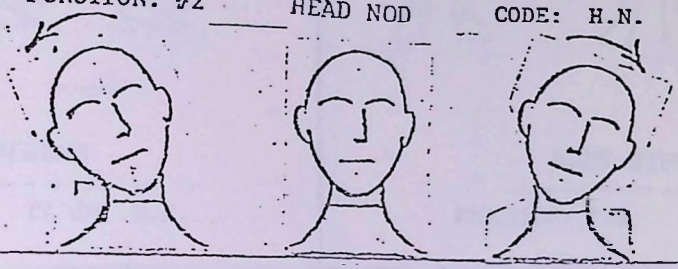




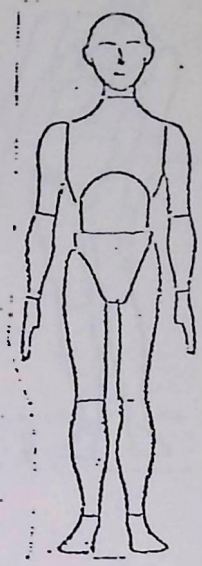
FUNCTION: #3 HEAD TURN CODE: H.T.



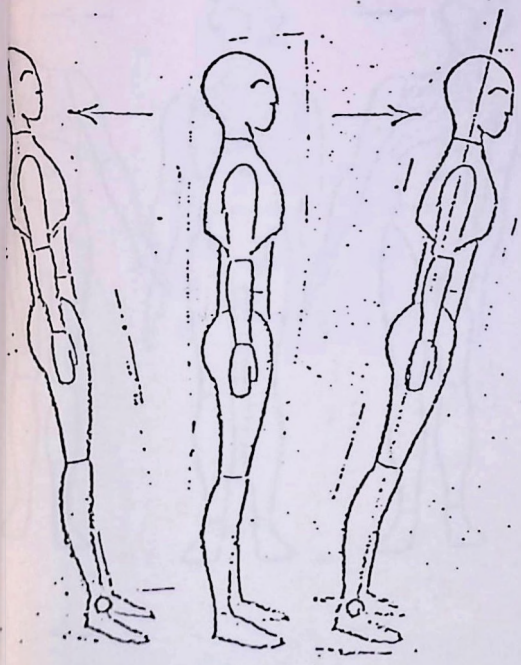
FUNCTION: #2 HEAD NOD CODE: H.N.



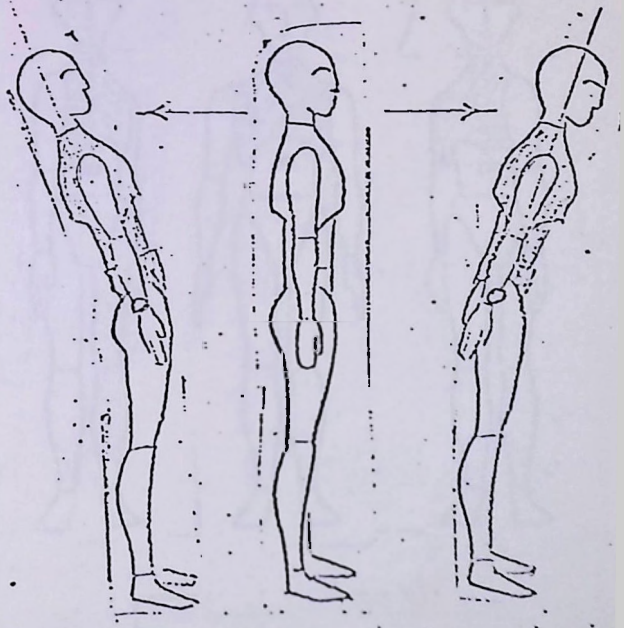
FUNCTION: #4 HEAD TILT CODE: H.T.



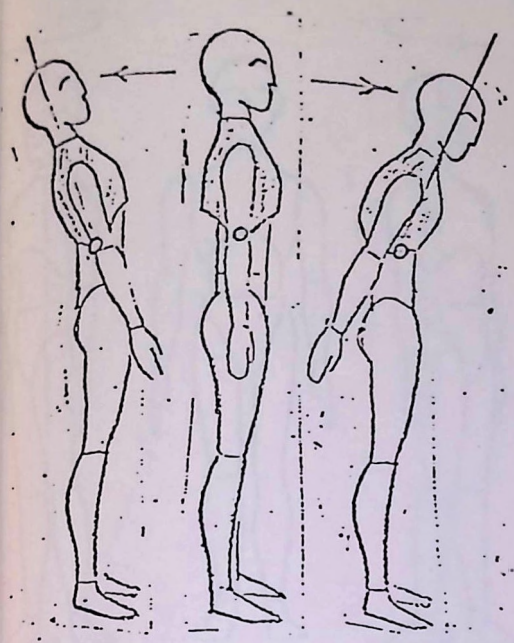
2. BASE FRAME



FUNCTION: #25 BODY FORESWAY CODE: B.F.



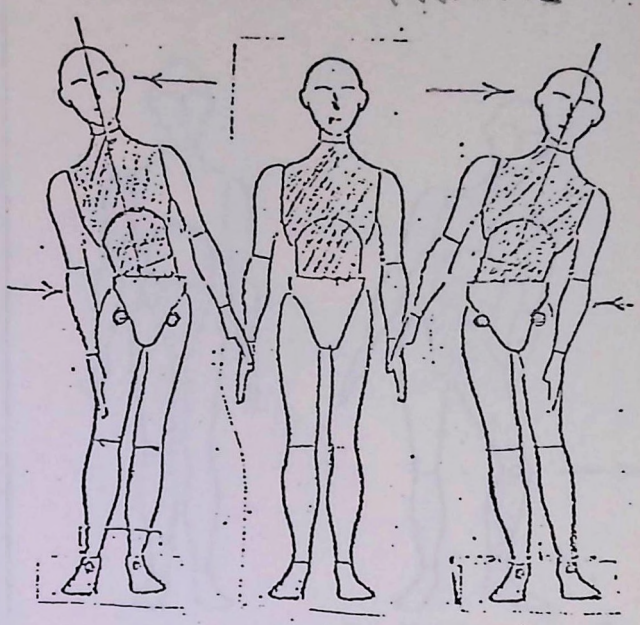
FUNCTION: #22 PELVIS BEND CODE: P.B.



TORSO FOREBEND

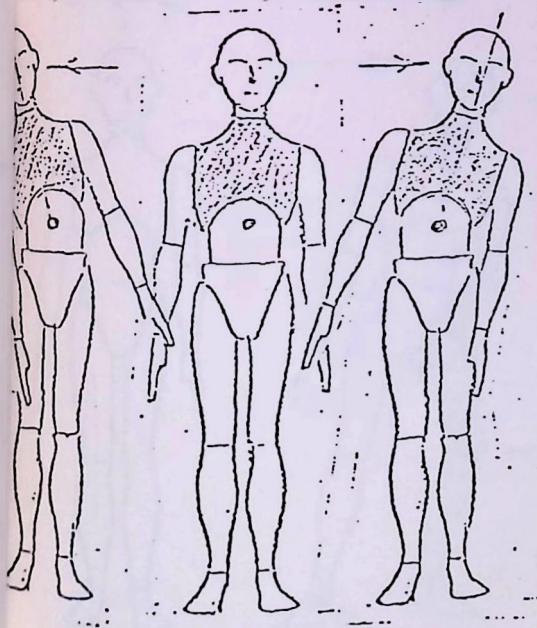
FUNCTION: #19 CODE: T.F.

IN BASE FRAME



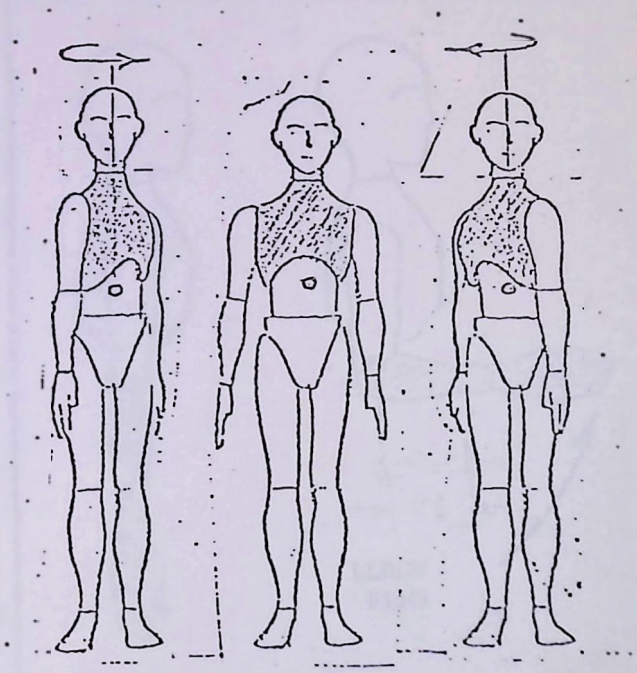
BODY SIDESWAY

FUNCTION: #23 CODE: B.S.



TORSO SIDEBEND

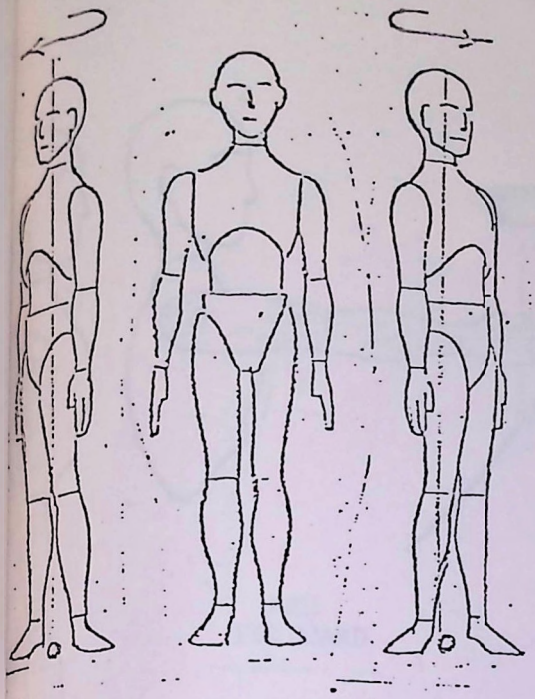
FUNCTION: #20 CODE: T.S.



TORSO TWIST

FUNCTION: #21 CODE: T.T.

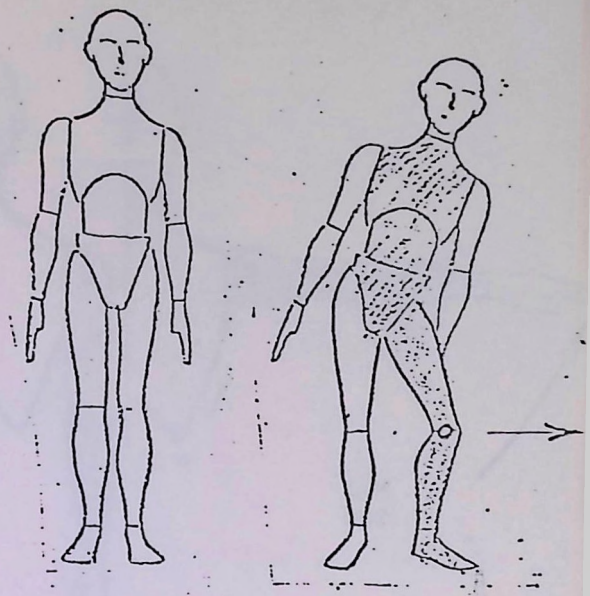
IN BASE FRAME



• BODY TWIST

BODY ROTATES FROM ANKLES

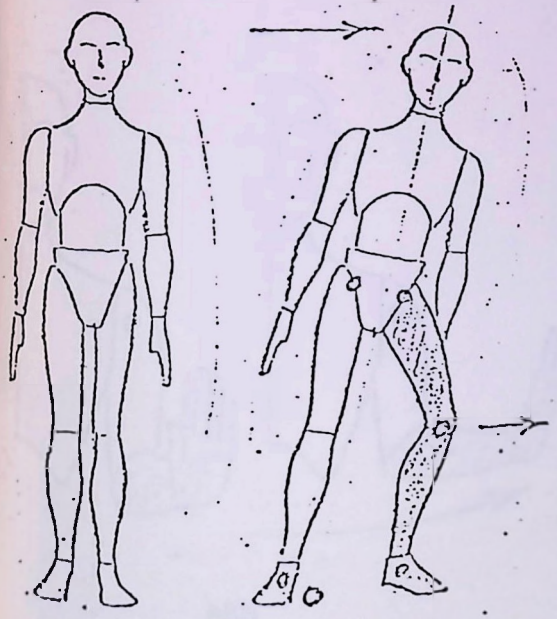
FUNCTION: #24_____ CODE: B.T.



KNEE BEND

FUNCTION: #26 CODE: K.B.

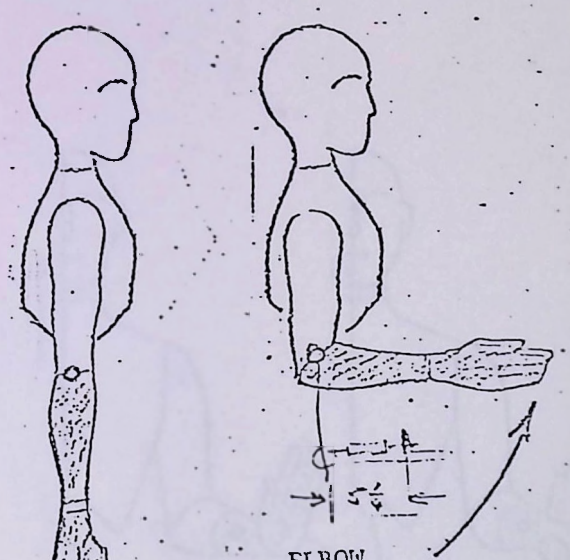
N BASE FRAME



FUNCTION: #26 KNEE BEND CODE: K.B.

WITH

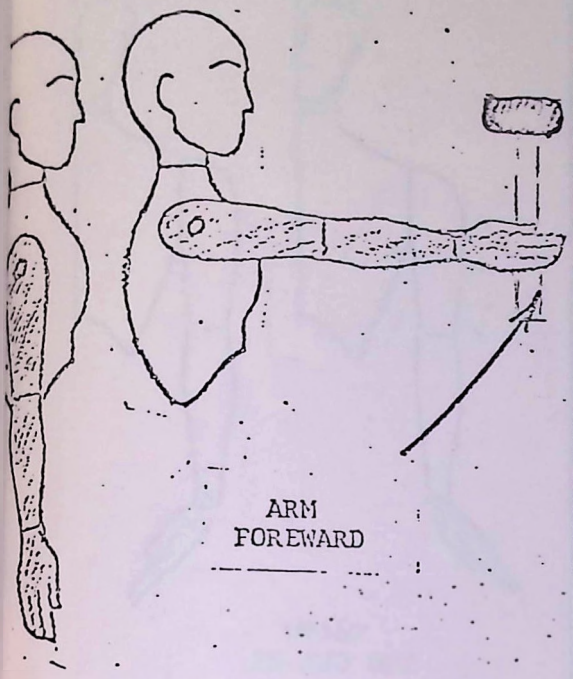
FUNCTION: #23 BODY SIDESWAY CODE: B.S.



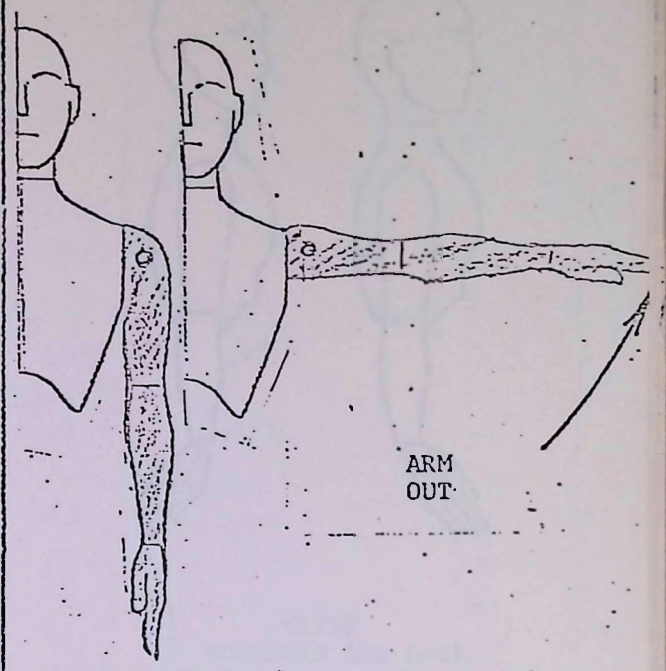
ELBOW BEND

RIGHT: FUNCTION #8 CODE: R.E.

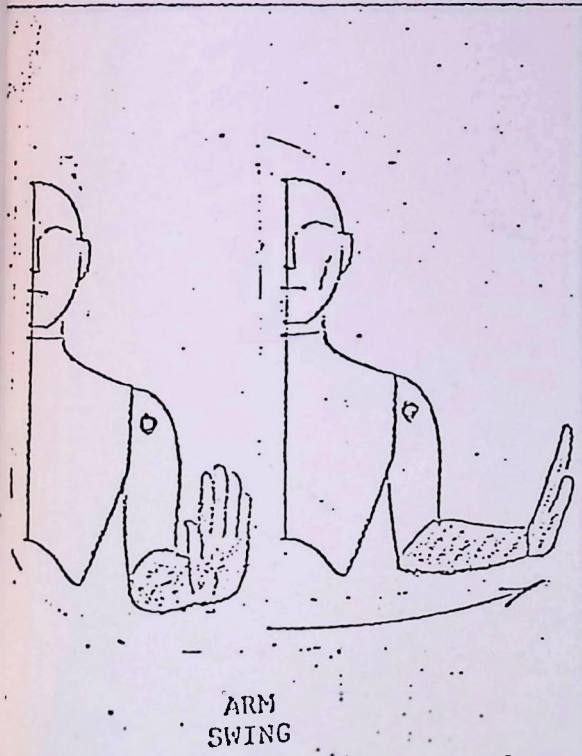
LEFT: FUNCTION #12 CODE: L.E.



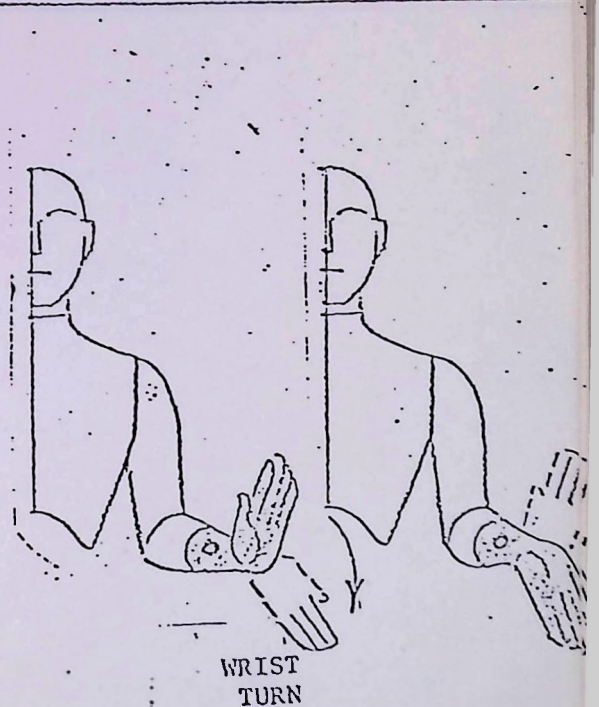
LEFT: FUNCTION #9 CODE: L.A.F.
RIGHT: FUNCTION #5 CODE: R.A.F.



LEFT: FUNCTION #10 CODE: L.A.O.
RIGHT: FUNCTION #6 CODE: R.A.O.



LEFT: FUNCTION #11 CODE: L.A.S.
RIGHT: FUNCTION #7 CODE: R.A.S.



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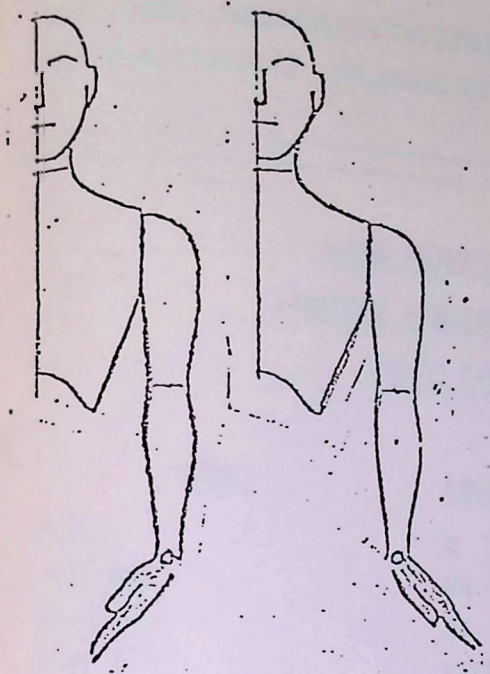
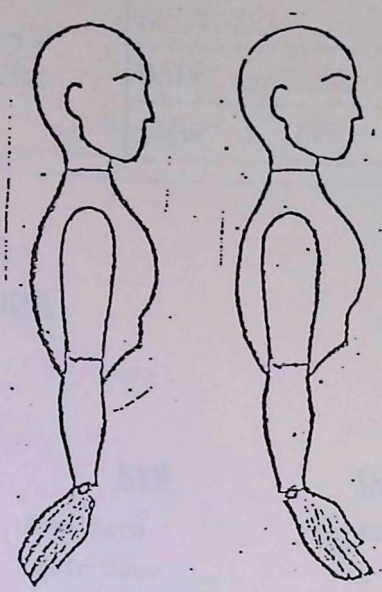
RIGHT: FUNCTION #15 CODE: R.W.T.



WRIST
IN AND OUT

LEFT: FUNCTION #16 CODE: L.W.I.O.
RIGHT: FUNCTION #13 CODE: R.W.I.O.



WRIST
FOREWARD AND BACK

LEFT: FUNCTION #17 CODE: L.W.F.B.
RIGHT: FUNCTION #14 CODE: R.W.F.B.

AUDIO-ANIMATRONIC FIGURES

STANDARD FUNCTION ABBREVIATIONS

HUMAN TYPE FIGURES

FUNCTION NO.	NAME	CODE
1	Mouth	M
2	Head Nod	HN
3	Head Turn	HT
4	Head Tilt	HTLT
5	Rt. Arm Forward	RAF
6	Rt. Arm Out	RAO
7	Rt. Arm Swing	RAS
8	Rt. Elbow	RE
9	Left Arm Forward	LAF
10	Left Arm Out	LAO
11	Left Arm Swing	LAS
12	Left Elbow	LE
13	Rt. Wrist In & Out	RWIO
14	Rt. Wrist Forward & Back	RWFB
15	Rt. Wrist Twist	RWT
16	Left Wrist In & Out	LWIO
17	Left Wrist Forward & Back	LWFB
18	Left Wrist Twist	LWT
19	Torso Forebend	TF
20	Torso Sidebend	TS
21	Torso Twist	TT
22	Pelvis	P
23	Body Side Sway	BS
24	Body Twist	BT
25	Body Foresway	BF
26	Knee Bend	KB
27	Chair Move	C
28	Right Thumb	RT
29	Right Forefinger	RF
30	Right Middle	RM
31	Right Ring	RR
32	Right Little	RL
33	Left Thumb	LT
34	Left Forefinger	LF
35	Left Middle	LM
36	Left Ring	LR
37	Left Little	LL

HEAD FUNCTION

38	Eye Blink	EB
39	Eye Right	ER
40	Eye Left	EL
41	Mouth Pinch Right	MPR
42	Mouth Pinch Left	MPL
43	Smile Right	SR
44	Smile Left	SL
45	Frown Left	FL
46	Frown Right	FR
47	Eyebrow Raise Right	ERR
48	Eyebrow Raise Left	ERL
49	F - Sound	FS
50	Foot Tap	FT

AUDIO-ANIMATRONIC FIGURES
STANDARD FUNCTION ABBREVIATIONS
ANIMAL/BIRD/SEA CREATURE FIGURES & ELECTRICAL

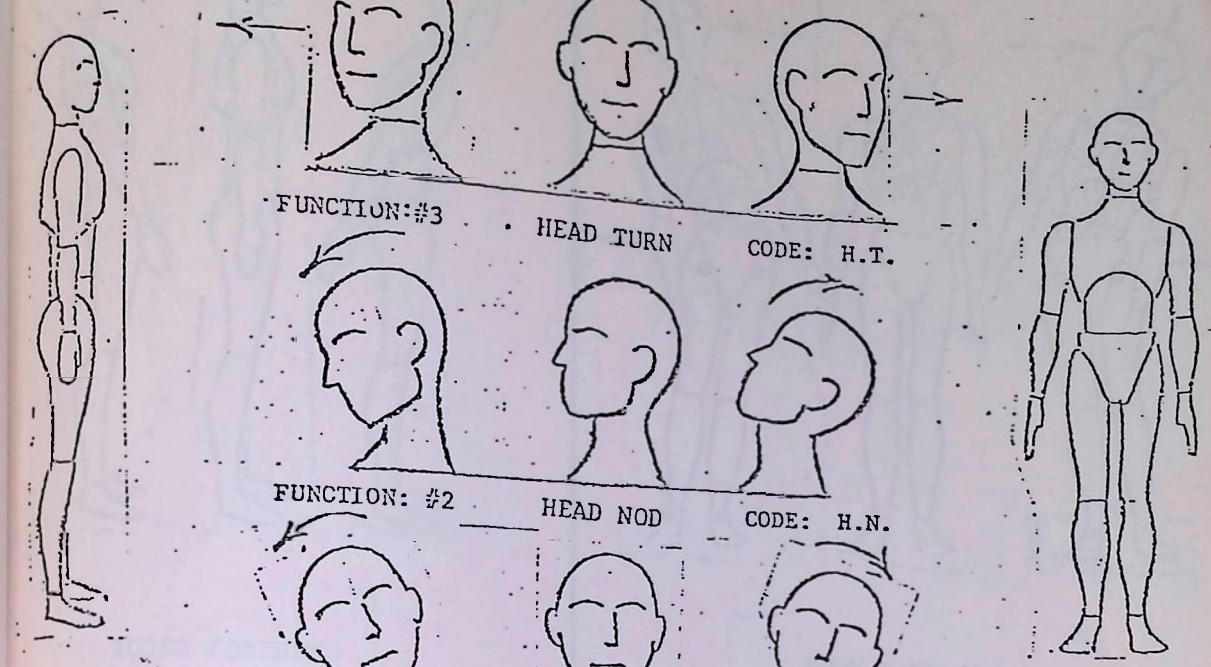
NAME	CODE
ANIMALS	
Neck Raise	NR
Neck Turn	NT
Tail	T
Left Ear	EL
Right Ear	ER
BIRDS	
Beak or Mouth	B or M
Head Nod	HN
Head Rotate Right	HRR
Head Rotate Left	HRL
Chest Out	CO
Body Back or Up	BB
Wing Flip	WF
Tail Flip	TF
ELECTRICAL	
Lighting Digital	
Lighting Analog	

FUNCTION NO.	NAME	CODE
	ELECTRICAL	
72	Speaker Switching	
73	Relay Coil	
74	Relay, Solid State	
75		
76		
77		
78		
79		
	SEA CREATURES	
80	Right Claw	
81	Left Claw	
82	Right Pincher	
83	Left Pincher	
84	Right Front Flipper	
85	Left Front Flipper	
86	Right Rear Flipper	
87	Left Rear Flipper	

NOTE: Any special functions will be labeled S1, S2, etc.

FOR

AUDIO ANIMATRONIC BODY MOVEMENTS

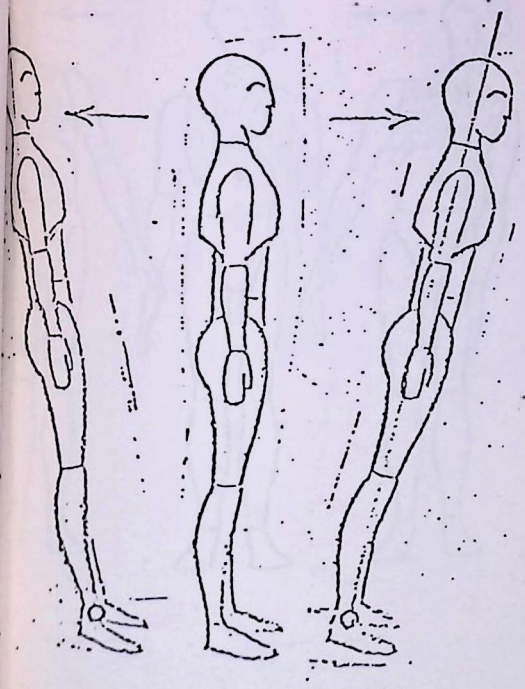


FUNCTION: #3 HEAD TURN CODE: H.T.

FUNCTION: #2 HEAD NOD CODE: H.N.

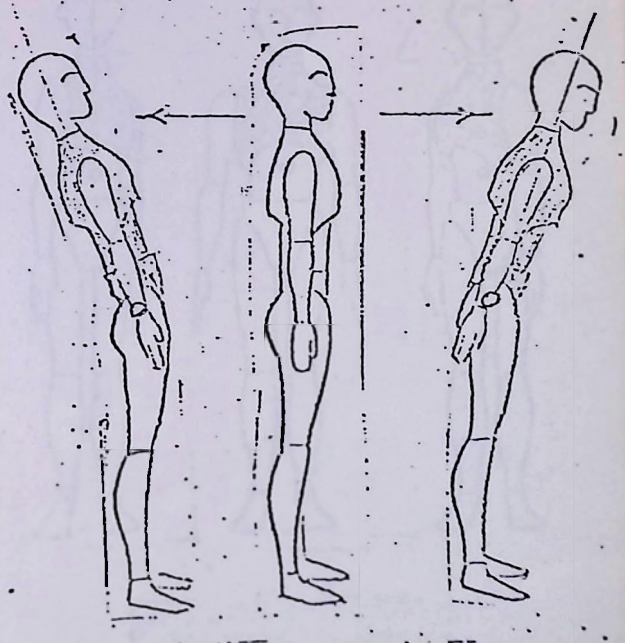
FUNCTION: #4 HEAD TILT CODE: H.T.

IN BASE FRAME



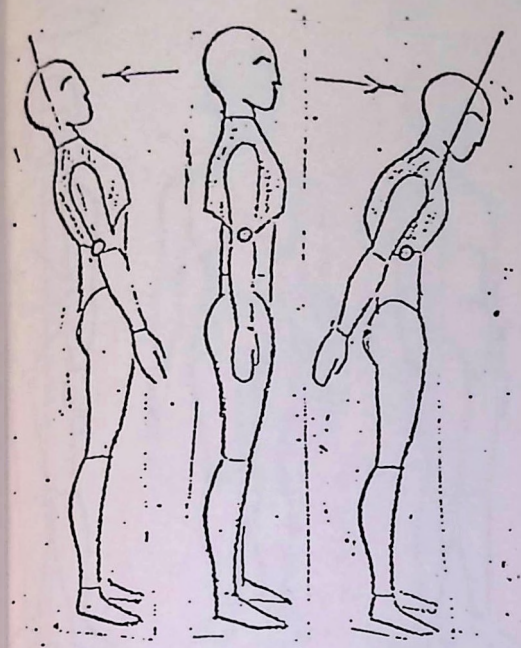
BODY FORESWAY

FUNCTION: #25 CODE: B.F.



PELVIS BEND

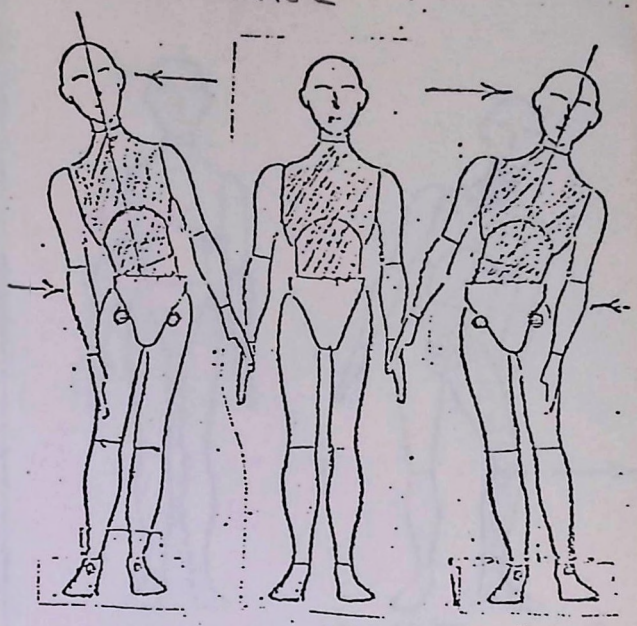
FUNCTION: #22 CODE: P.B.



TORSO FOREBEND

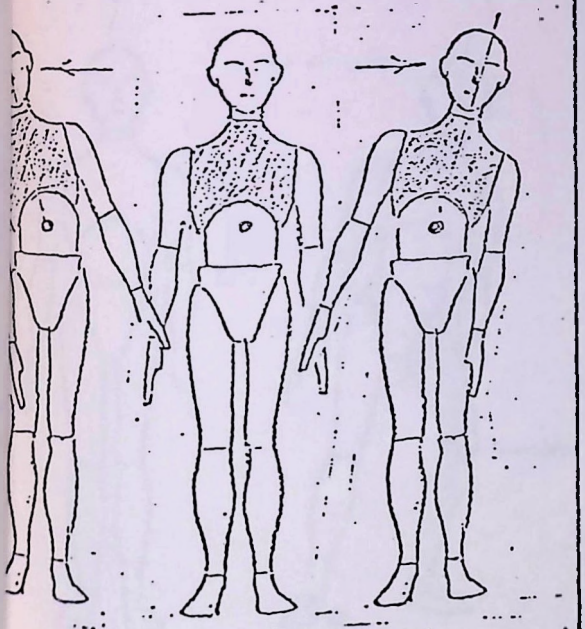
FUNCTION: #19 CODE: T.F.

IN BASE FRAME



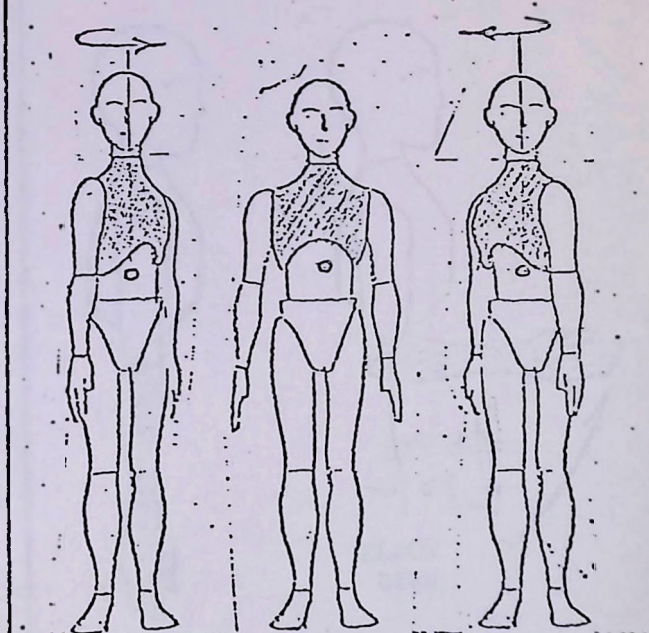
BODY SIDESWAY

FUNCTION: #23 CODE: B.S.



TORSO SIDEBEND

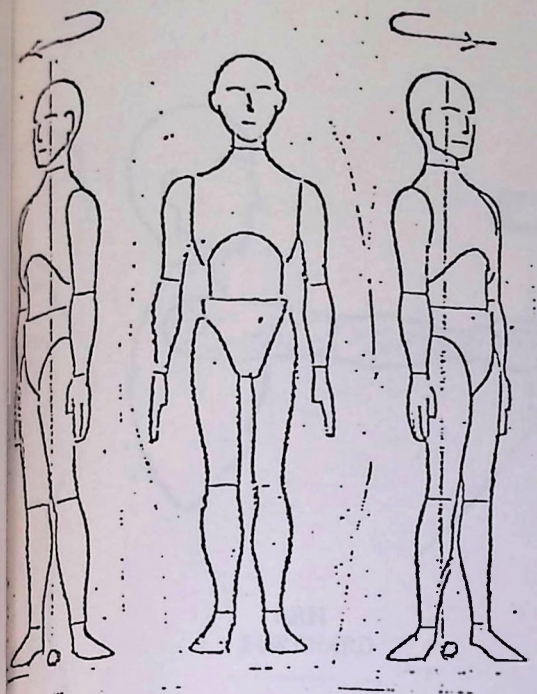
FUNCTION: #20 CODE: T.S.



TORSO TWIST

FUNCTION: #21 CODE: T.T.

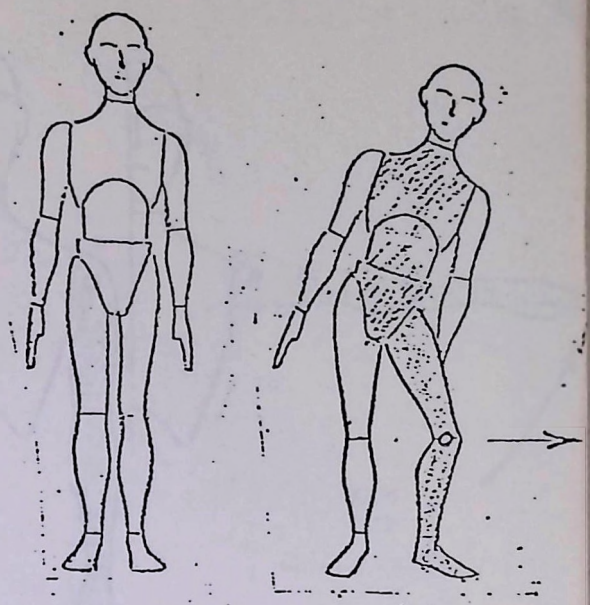
IN BASE FRAME



BODY TWIST

BODY ROTATES FROM ANKLES

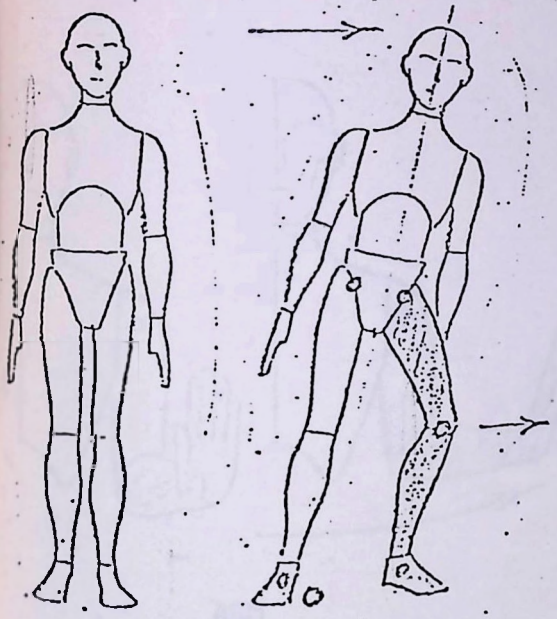
FUNCTION: #24 CODE: B.T.



KNEE BEND

FUNCTION: #26 CODE: K.B.

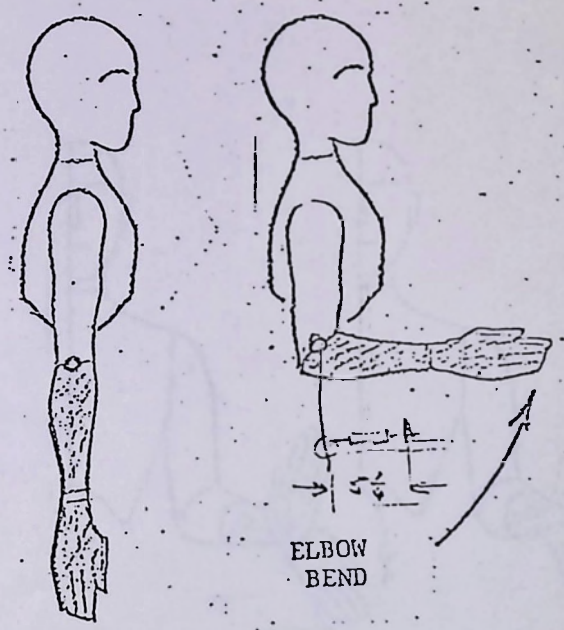
IN BASE FRAME



FUNCTION: #26 KNEE BEND CODE: K.B.

WITH

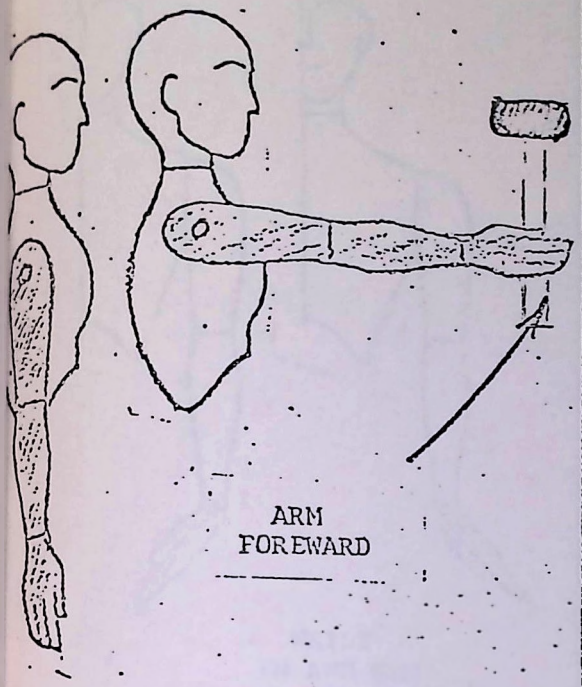
FUNCTION: #23 BODY SIDESWAY CODE: B.S.



ELBOW BEND

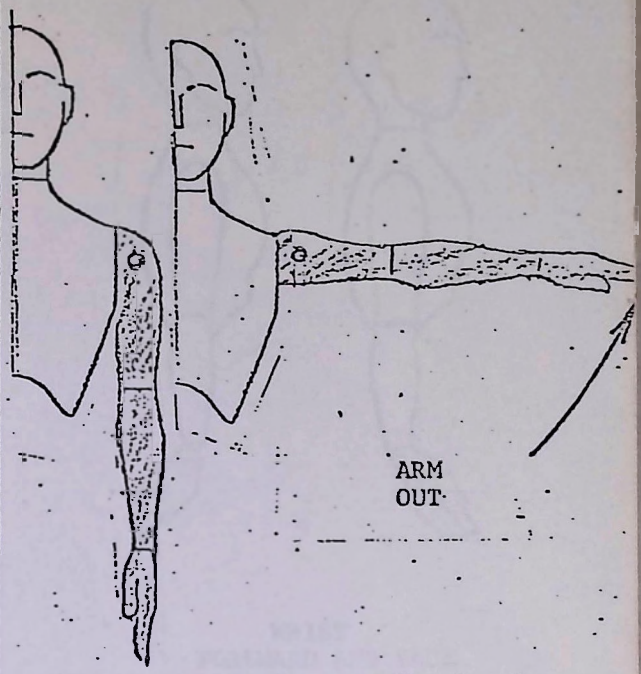
RIGHT: FUNCTION #8 CODE: R.E.

LEFT: FUNCTION #12 CODE: L.E.



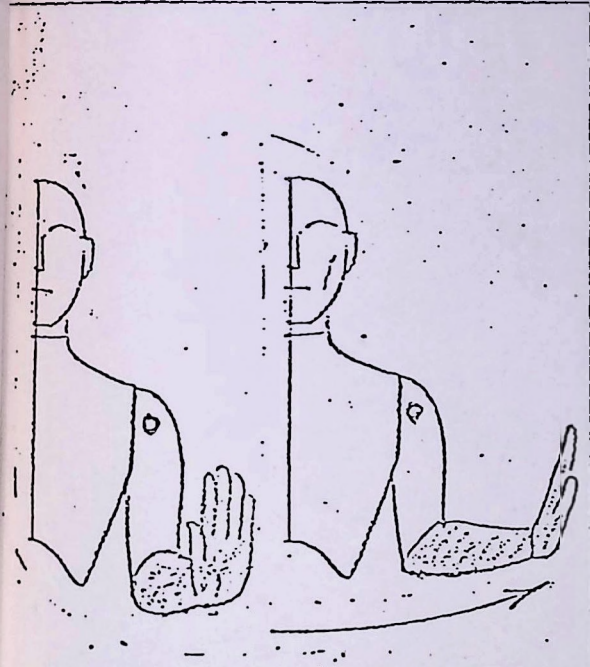
ARM
FOREWARD

LEFT: FUNCTION #9 CODE: L.A.F.
RIGHT: FUNCTION #5 CODE: R.A.F.



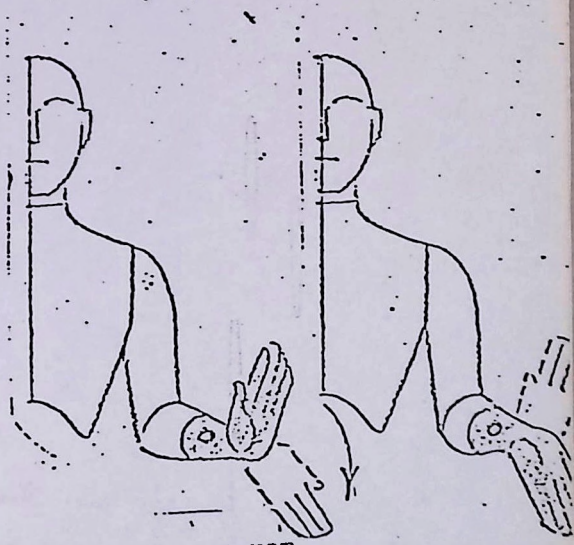
ARM
OUT

LEFT: FUNCTION #10 CODE: L.A.O.
RIGHT: FUNCTION #6 CODE: R.A.O.



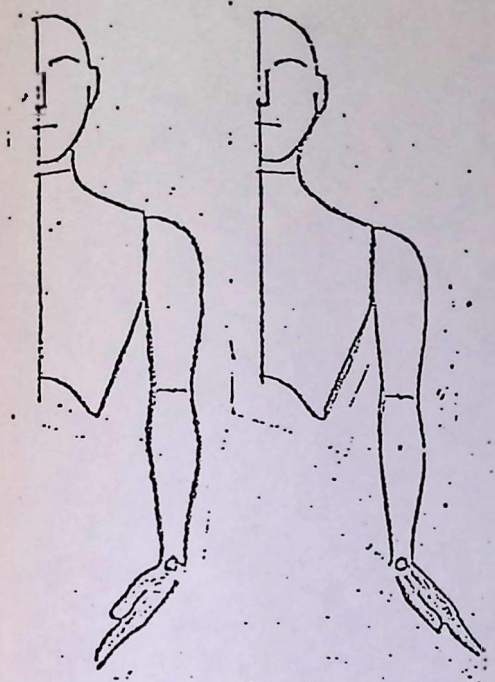
ARM
SWING

LEFT: FUNCTION #11 CODE: L.A.S.
RIGHT: FUNCTION #7 CODE: R.A.S.



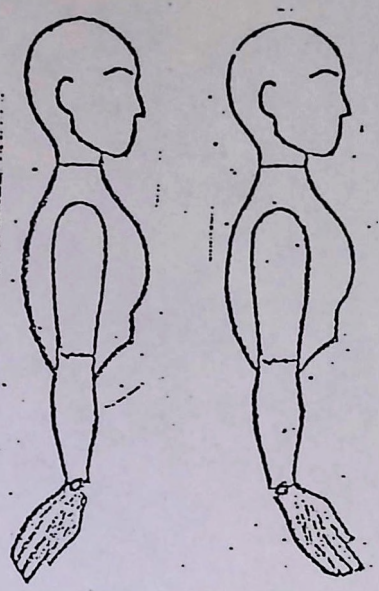
WRIST
TURN

LEFT: FUNCTION #18 CODE: L.W.T.
RIGHT: FUNCTION #15 CODE: R.W.T.



WRIST
IN AND OUT

LEFT: FUNCTION #16 CODE: L.W.I.O.
RIGHT: FUNCTION #13 CODE: R.W.I.O.



WRIST
FOREWARD AND BACK

LEFT: FUNCTION #17 CODE: L.W.F.B.
RIGHT: FUNCTION #14 CODE: R.W.F.B.