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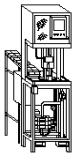
Design-In Ergonomics Checklist

Asia Pacific Population - S. China, S. Korea, Japan, India



Step 3: Equipment Design

Program: _____ Job/Operation Description: _____ Date: _____

Phase: _____ Design _____ Mock-up _____ Pre-Production _____ Other (list): _____ Analyst: _____

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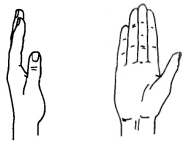
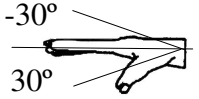
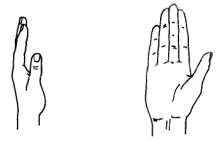
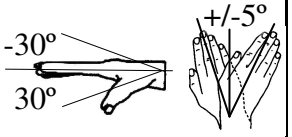
	Design Factor	Design Guidelines	Graphic	Check Circle: OK	Outside Guidelines	N/A
3.1	**Repetition** Operator Cycle Time (seconds)	0 5 10 15 20 25 30 35 40 45 50 55 60 Repetitive | Non-Repetitive*	Seconds 0 Repetitive 15 30 45	○	○	○
	*If job is > 30 seconds, indicate the percentage of cycle time where same motion(s) is repeated or sustained:	N/A 10% 20% 33% 40% 50% 60% 70% 80% 90% 100% Non-Rep. | Repetitive		○	○	○
3.2	**One Hand Force** Neutral Wrist	lbs. 0 2 4 6 8 10 12 14 16 18 Repetitive | Non-Repetitive kg. 0 1 2 3 4 5 6 7 8	 	○	○	○
	Deviated Wrist (1/2 the force of neutral wrist)	lbs. 0 1 2 3 4 5 6 7 8 9 Repetitive | Non-Repetitive kg. 0 1 2 3 4		○	○	○
3.3	**Finger Force/Pinch Grip** Neutral Wrist	lbs. 0 1 2 3 4 5 6 7 8 9 10 Rep. | Non-Repetitive kg. 0 1 2 3 4 4.5	 	○	○	○
	Deviated Wrist (1/2 the force of neutral wrist)	lbs. 0 1 2 3 4 5 Rep. | Non-Repetitive kg. 0 1 2 2.3		○	○	○

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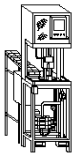

Step 3: Equipment Design

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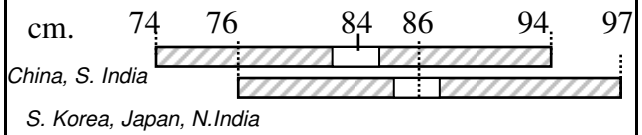
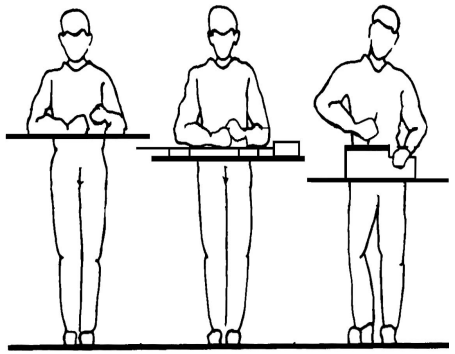
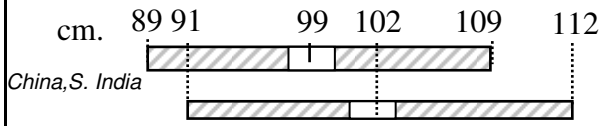
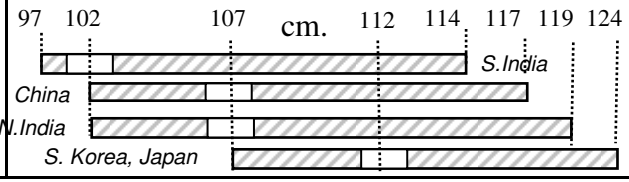
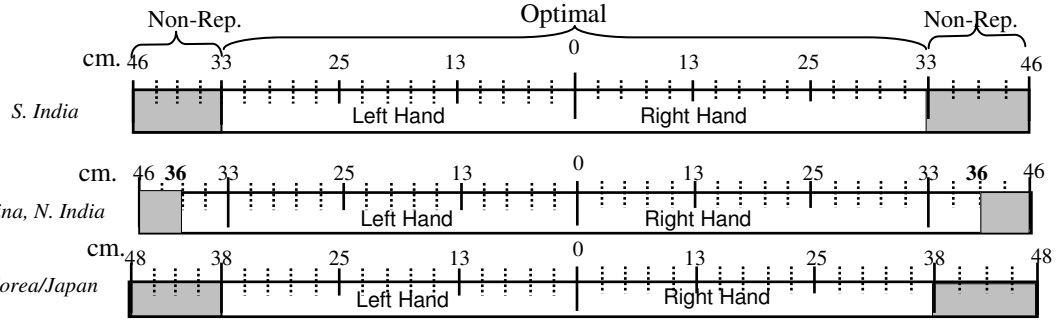
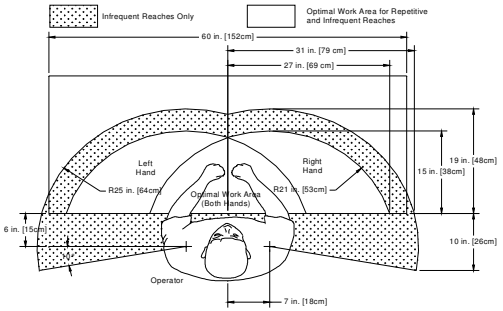
	Design Factor	Design Guidelines	Graphic	Check Circle: OK	Outside Guidelines	N/A
3.4	**Vertical Hand Height - Measured from standing surface to where the work is performed (hand height).**					
	Heavy Work, > 10 lbs. (5 kg)			○	○	○
	Light Work, <= 10 lbs. (5 kg)			○	○	○
	Precision Work, < 2 lbs. (1 kg)			○	○	○
3.5	**Horizontal Forward Reach** (Measured from front edge of table to where hands perform work in front of body.)			○	○	○

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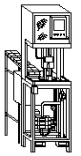

Step 3: Equipment Design

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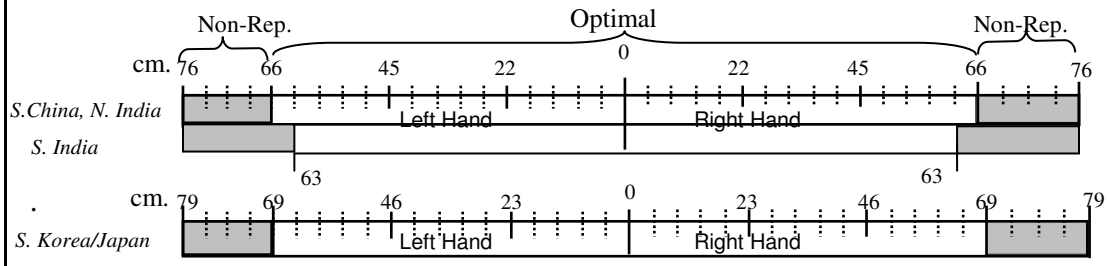
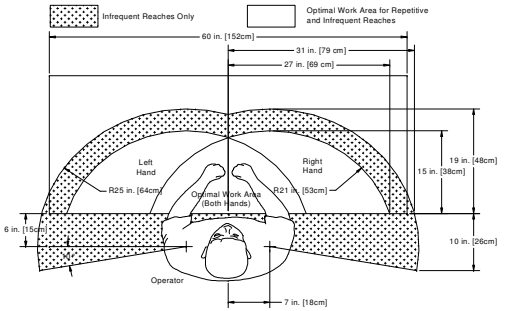
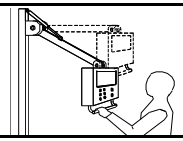
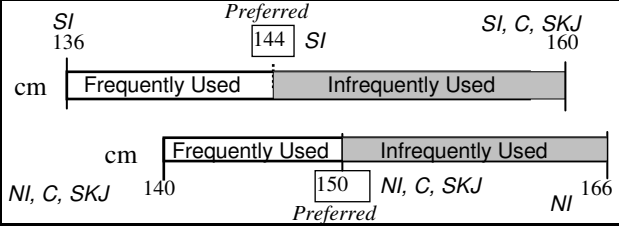
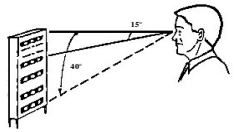
	Design Factor	Design Guidelines	Graphic	Check Circle: OK	Outside Guidelines	N/A
3.6	**Horizontal Side Reach** (Measured from the center front edge of table to where hands perform work left and right.)			○	○	○
3.7	**Monitors -** Monitors should be easily accessible. Is monitor location adjustable?	_____ Vertically _____ Horizontally _____ Tilt _____ Swing Arm _____ Not applicable _____ Not adjustable* Preferred		○	○	○
	* If not adjustable, vertical location of monitor should be 'standing eye height' (measured from standing surface to top of screen). *China = C* *S.Korea/Japan = SKJ* *S. India = SI* *N. India = NI*			○	○	○

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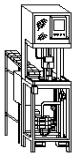

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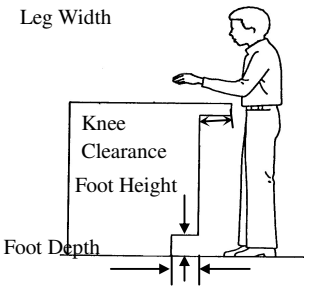
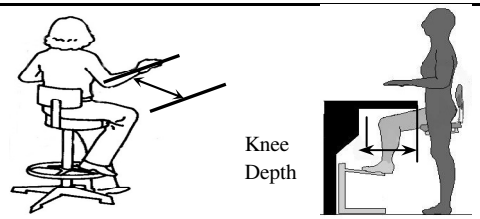
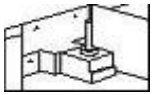
	Design Factor	Design Guidelines	Graphic	Check Circle: OK	Outside Guidelines	N/A
3.8	**Clearances for Stand Only** Foot Height	in. 4" Minimum 5 6+ / cm. 10cm Minimum 13 15+		○	○	○
	Foot Depth	in. 5" Minimum 6 7+ / cm. 13cm Minimum 15 18+		○	○	○
	Knee Depth	in. 4" Minimum 5 6+ / cm. 10cm Minimum 13 15+		○	○	○
3.9	**Clearances for Sit/Stand** Leg Width	in. 24" Minimum 25 26+ / cm. 61cm Minimum 64 66+		○	○	○
	Knee Depth	in. 20" Minimum 21 22+ / cm. 51cm Minimum 53 56+		○	○	○
3.10	**Noise**	See Delphi-A Sound Level Specifications or Industrial Hygiene for further information.	http://apollo.delphiauto.net/health_safety/procedur.htm	○	○	○
3.11	**Lighting**	Would internal machine lighting aid operator in operation, changeover, set-up, PM, etc.?	No picture	○	○	○
3.12	**Single Controls** (whisker switch, wobble stick, etc.)	Should be placed at approximately the same vertical location as where hands are performing work. Vertical hand height (in/cm):		○	○	○

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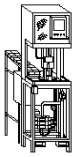

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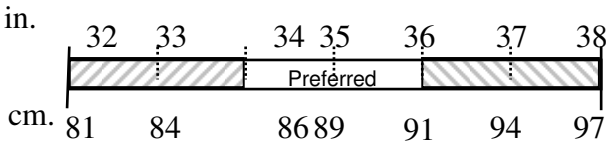
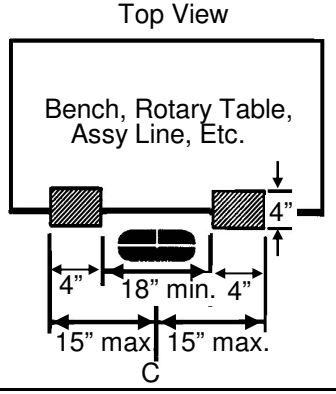
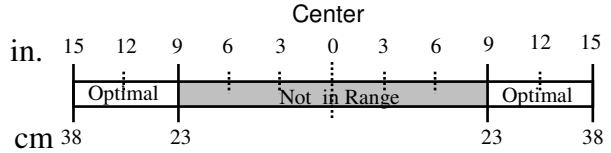
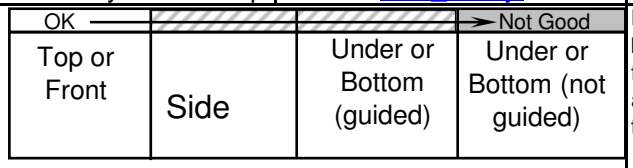
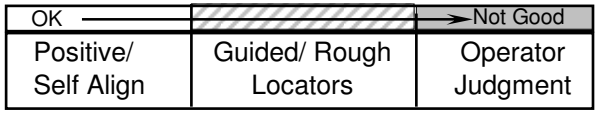
	Design Factor	Design Guidelines	Graphic	Check Circle: OK	Outside Guidelines	N/A
3.13	**Dual Controls** Vertical Location (Measured from standing surface)			○	○	○
	Horizontal Location (Measured from center of controls)			○	○	○
	For more information on controls and safety, visit this web site or talk to your H&S rep.	http://apollo.delphiauto.net/heath_safety/				
3.14	**Component Placement into Fixture** - Visual Access		Loading a fixture from the top or front is preferable because it requires less operator time. When loading from under or bottom, like the upper mandrel of an arbor press, the load is blind and requires additional time for alignment and placing.	○	○	○
3.15	**Component Alignment Options into Fixture**		Another efficiency factor is the design of the fixture. Positive or self-aligning fixtures are preferred to prevent the operator from having to make assessments on proper part placement.	○	○	○
3.16	**Line of Sight Obstructions**	Is it possible to see the fixture or perform the task without having to stoop or bend?	Design equipment and locate fixtures so operators do not have to bend their neck or back in order to load, see, activate, unload, etc. An awkward posture is an injury risk factor.	○	○	○