

ภาคผนวก ก.
ตารางประกอบการคำนวณ

ตารางที่ ก.1 แสดงค่าแฟกเตอร์ Y [6]

ประเภท ภาระ	Y_1	จำนวนผิว วัสดุรอง	Y_2	สภาพผิวสัมผัส	Y_3	ความ ยาวสกรู	Y_4
สถิตย์	1.5	3	1.5	ผิวปาดละเอียดมาก	1.5	$L > 5d$	1.5
เปลี่ยนแปลงไม่มาก	3	4	3	ผิวปาดละเอียด	3	$L \approx 5d$	3
เปลี่ยนแปลงมาก	5	6	5	ผิวหยาบซีโลมน้ำมัน	4	$L < 5d$	5
				ผิวหยาบ ผิวตะไบหยาบ	5		

ตารางที่ ก.2 แสดงแฟกเตอร์งานของเพลลา [6]

งานที่ทำ	C_B
เครื่องกลทำงานด้วยไฟฟ้า	1.0 – 1.1
ชุดเครนเครื่องไส เครื่องยนต์ลูกสูบ	1.2 – 1.5
เครื่องตัด เครื่องปั๊ม	1.6 – 2.0
เครื่องย่อยหิน เครื่องรีดโลหะ	2.0 – 3.0

ตารางที่ ก.3 แสดงค่าแฟกเตอร์โมเมนต์ของเพลลา [6]

C_1	$\tau_{all} \left(\frac{N}{mm^2} \right)$	วัสดุ
6.9	15	St 37 , St 45
5.3	20	St 50 , St 60
5.8	25	สำหรับเหล็กกล้าที่มีความเค้นสูงกว่า

ตารางที่ ก.4 ตารางค่าตัวคูณที่ใช้งาน (Application Service Factor) [8]

	Service Factors					Service Factors					Service Factors			
	Electric Motor w/ Standard Torque	Electric Motor w/ High Torque	Steam Turbines & En- gines w/4 or more cyl.*	Reciprocating Engines* 1-2 Cyl.		Electric Motor w/ Standard Torque	Electric Motor w/ High Torque	Steam Turbines & En- gines w/4 or more cyl.*	Reciprocating Engines* 1-2 Cyl.		Electric Motor w/ Standard Torque	Electric Motor w/ High Torque	Steam Turbines & En- gines w/4 or more cyl.*	Reciprocating Engines* 1-2 Cyl.
Agitators	1.00	1.25	1.00	1.7	1.3	Feeders								
Band Resaw (lumber) ..	1.50	1.75	1.50	2.2	1.8	Belt, Screw	1.00	1.25	1.00	1.7	1.3	Beater, Pulper,		
Barge Haul Puller	2.00	2.25	2.00	2.7	2.3	Reciprocating	2.50	2.75	2.50	3.2	2.8	Jordans, Dresses	2.00	2.25
Beaters	1.50	1.75	1.50	2.2	1.8	Filter, Press-oil	1.50	1.75	1.50	2.2	1.8	Calenders, Dryers, Washers,		
Blowers						Generators						Thickener	1.50	1.75
Centrifugal	1.00	1.25	1.00	1.7	1.3	Not Welding	1.00	1.25	1.00	1.7	1.3	Converting Machines,		
Lobe, Vane	1.25	1.50	1.25	2.0	1.6	Welding	2.00	2.25	2.00	2.7	2.3	Conveyors	1.20	1.45
Bottling Machinery	1.25	1.50	1.25	2.0	1.6	Hoist	1.50	1.75	1.50	2.2	1.8	Printing Presses	1.50	1.75
Brew Kettles (distilling) ..	1.25	1.50	1.25	2.0	1.6	Hammermills	2.00	2.25	2.00	2.7	2.3	Pug Mill	1.75	2.00
Can Filling Machinery	1.00	1.25	1.00	1.7	1.3	Kilns	1.50	1.75	1.50	2.2	1.8	Pumps		
Car Dumpers	2.50	2.75	2.50	3.2	2.8	Laundry Washers—						Centrifugal	1.00	1.25
Car Pullers	1.50	1.75	1.50	2.2	1.8	Reversing	2.00	2.25	2.00	2.7	2.3	Gear, Rotary, Vane	1.25	1.50
Card Machine	1.75	2.00	1.75	2.5	2.0	Lumber Machinery						Reciprocating:		
Chiller (oil)	1.50	2.00	1.25	2.0	2.0	Barkers, Edger Feeder,						1-Cyl. Single or		
Compressors						Live Roll	2.00	2.25	2.00	2.7	2.3	Double Acting	2.00	2.25
Centrifugal	1.00	1.25	1.00	1.7	1.3	Planer, Slab Conveyor ..	2.00	2.25	2.00	2.7	2.3	2-Cyl. Single Acting ..	2.00	2.25
Screw, Lobe	1.25	1.50	1.25	2.0	1.6	Machine Tools						2-Cyl. Double Acting	1.75	2.00
Reciprocating	See Note					Punch Press-gear Driven,						3 or more Cyl.	1.50	1.75
Conveyors, Uniformly Fed						Plate Planer	2.00	2.25	2.00	2.7	2.3	Rubber Machinery		
Assembly, Belt, Screw	1.00	1.25	1.00	1.7	1.3	Tapping Machinery,						Mixers	2.50	2.75
Bucket, Sawdust	1.25	1.50	1.25	2.0	1.6	Bending Roll	2.00	2.25	2.00	2.7	2.3	Rubber Calender	2.00	2.25
Live Roll, Shaker,						Main Drive	1.50	1.75	1.50	2.2	1.8	Screens		
..... Reciprocating	3.00	3.25	3.00	3.7	3.3	Auxiliary Drives	1.00	1.25	1.00	1.7	1.3	Air washing, Water	1.00	1.25
Conveyors, Not Uniformly Fed						Metal Forming Machines						Rotary—stone or gravel,		
Assembly, Belt,						Draw Bench-carriage						Dewatering	1.50	1.75
..... Oven, Screw	1.20	1.45	1.20	1.9	1.5	& Main Drive	2.00	2.25	2.00	2.7	2.3	Vibrating	2.50	2.75
Reciprocating	2.50	2.75	2.50	3.2	2.8	Extruder, Forming Machine,						Grizzly	2.00	2.25
Shaker	3.00	3.25	3.00	3.7	3.3	Wire Drawing	2.00	2.25	2.00	2.7	2.3	Shredders	1.50	1.75
Cookers—Brewing, Distilling,						Table Conveyors	2.50	2.75	2.50	3.2	2.8	Steering Gears	1.00	1.25
Food	1.25	1.50	1.25	2.0	1.6	Wire Winding, Coilers,						Stokers	1.00	1.25
Cranes & Hoist	2.00	2.25	2.00	2.7	2.3	Slitters	1.50	1.75	1.50	2.2	1.8	Suction Roll (paper) ..	1.50	1.75
Crushers—Cane (sugar), Stone, or Ore						Mills, Rotary Type						Textile Machinery		
.....	3.00	3.25	3.00	3.7	3.3	Ball, Kilns, Pebble,						Dryers, Dyeing Machinery,		
Dredges						Rolling, Tube	2.00	2.25	2.00	2.7	2.3	Mangle	1.20	1.45
Cable reels	2.00	2.25	2.00	2.7	2.3	Cement Kilns,						Loom, Spinner,		
Conveyors, Pumps,						Dryers, Coolers	2.00	2.25	2.00	2.7	2.3	Tenter frames	1.50	1.75
Maneuvering Winches	1.50	1.75	1.50	2.2	1.8	Tumbling	1.50	1.75	1.50	2.2	1.8	Tumbling Barrels	1.75	2.00
Cutter Head Drives	2.50	2.75	2.50	3.2	2.8	Mixers						Windlass	2.00	2.25
Dynamometer	1.50	1.75	1.50	2.2	1.8	Concrete, continuous ..	1.75	2.00	1.75	2.5	2.0	Woodworking Mach.	1.00	1.25
Evaporators	1.00	1.25	1.00	1.7	1.3	Muller	1.50	1.75	1.50	2.2	1.8			
Fans						Paper Mills								
Centrifugal	1.00	1.25	1.00	1.7	1.3	Agitator (mixers),								
Cooling Towers	2.00	2.25	2.00	2.7	2.3	Reel, Winder	1.20	1.45	1.20	1.9	1.5			
Forced Draft,						Winder	1.20	1.45	1.20	1.9	1.5			
Propeller	1.50	1.75	1.50	2.2	1.8	Barker (mechanical),								
Induced draft						Log Haul, Chipper	2.00	2.25	2.00	2.7	2.3			
w/damper control	2.00	2.25	2.00	2.7	2.3	Barking Drum								
Induced draft w/o						(spur gear)	2.50	2.75	2.50	3.2	2.8			
damper control	1.25	1.50	1.25	2.0	1.6									

Caution: Applications involving reciprocating engines and reciprocating driven devices are subject to critical rotational speeds which may damage the coupling and/or connected equipment. Contact Lovejoy Engineering with specific requirements.

ตารางที่ ก.5 ตารางการเลือกวัสดุลูกยางแนก [8]

Characteristics	Temperature Range	Misalignment		Shore Hardness ¹	Dampening Capacity	Chemical Resistance ²	Color
		Angular Degree	Parallel Inch				
SOX (NBR) Rubber—Nitrile Butadiene (Buna N) Rubber is a flexible elastomer material that is oil resistant, resembles natural rubber in resilience and elasticity and operates effectively in temperature range of -40 to +212°F (-40 to +100°C). Good resistance to oil. Standard elastomer. (Also applies to SXB Cushions.)	-40° to +212° F -40° to +100° C	1°	.015	80A	HIGH	GOOD	BLACK
URETHANE—Urethane has greater torque capability than NBR (1.5 times), provides less dampening effect, and operates at a temperature range of -30 to +160°F (-34 to +71°C). Good resistance to oil and chemicals. Not recommended for cyclic or start/stop applications.	-30° to +160° F -34° to +71° C	1°	.015	55D L050-L110 90-95A L150-L225	LOW	VERY GOOD	BLUE
HYTREL—Hytrel is a flexible elastomer designed for high torque and high temperature operations. Hytrel can operate in temperatures of -60F to +250°F (-51 to +121°C) and has an excellent resistance to oil and chemicals. Not recommended for cyclic or start/stop applications.	-60° to +250° F -51° to 121° C	1/2°	.015	55D	LOW	EXCELLENT	TAN
BRONZE—Bronze is a rigid, porous oil-impregnated metal insert exclusively for slow speed (maximum 250 RPM) applications requiring high torque capabilities. Bronze operations are not affected by extreme temperatures, water, oil, or dirt.	-40° to +450° F -40° to +232° C	1/2°	.010		NONE	EXCELLENT	BRONZE

ตารางที่ ก.6 การเลือกขนาดคัปปลิ่งที่เหมาะสม [8]

Size	Maximum Bore		Spider Material							
	Inch	mm	SOX(NBR) Torque		Urethane Torque		Hytrel Torque		Bronze Torque	
			in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
L035	.375	9	3.5	0.4	N/A	N/A	N/A	N/A	N/A	N/A
L/AL050	.625	16	26.3	3.0	39	4.5	50	5.6	50	5.6
L/AL070	.750	19	43.2	4.9	65	7.3	114	12.9	114	12.9
L/AL075	.875	22	90.0	10.2	135	15.3	227	25.6	227	25.6
L/AL090	1.000	25	144.0	16.3	216	24.4	401	45.3	401	45.3
L/AL095	1.125	28	194.0	21.9	291	32.9	561	63.4	561	63.4
L/AL099	1.188	30	318.0	35.9	477	53.9	792	89.5	792	89.5
L/AL100	1.375	35	417.0	47.1	626	70.7	1134	128.0	1134	128.0
L/AL110	1.625	42	792.0	89.5	1188	134.0	2268	256.0	2268	256.0
L150	1.875	48	1240.0	140.0	1860	210.0	3708	419.0	3706	419.0
AL150	1.875	48	1450.0	163.8	N/A	N/A	N/A	N/A	N/A	N/A
L190	2.125	55	1728.0	195.0	2592	293.0	4680	529.0	4680	529.0

ตารางที่ ก.6 (ต่อ) การเลือกขนาดปั๊มที่เหมาะสม [8]

Size	Maximum Bore		Spider Material							
			SOX(NBR) Torque		Urethane Torque		Hytrel Torque		Bronze Torque	
	Inch	mm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
L225	2.625	65	2340.0	264.0	3510	397.0	6228	704.0	6228	704.0
L276	2.875	73	4716.0	533.0	N/A	N/A	N/A	N/A	12500	1412.0
C226	2.500	64	2988.0	338.0	N/A	N/A	5940	671.0	5940	671.0
C276	2.875	73	4716.0	533.0	N/A	N/A	9432	1066.0	N/A	N/A
C280	3.000	76	7560.0	854.0	N/A	N/A	13866	1567.0	N/A	N/A
C285	4.000	102	9182.0	1038.0	N/A	N/A	16680	1882.0	N/A	N/A
C295	3.500	89	11340.0	1281.0	N/A	N/A	22680	2563.0	22680	2563.0
C2955	4.000	102	18900.0	2136.0	N/A	N/A	37800	4271.0	37800	4271.0
H3067	4.500	114	33395.0	3774.0	N/A	N/A	47196	5333.0	47196	5333.0
H3567	5.000	127	46632.0	5269.0	N/A	N/A	63000	7119.0	63000	7119.0
H3667	5.629	143	64812.0	7323.0	N/A	N/A	88200	9966.0	88200	9966.0
H4067	6.250	159	88224.0	9969.0	N/A	N/A	126000	14237.0	126000	14237.0
H4567	7.000	178	119700.0	13525.0	N/A	N/A	170004	19209.0	170000	19209.0