1 A	В	С	D	E	F	G	Н	I	J	K	L	ΜN
	MA'	TLAB P	roject (#2) - Metallic	: Failure A	nalvsis							
3 .			ace Structural Analysis, Uni			go (Copyright	J.B. Kosmatl	ka, 2020)				
5		Version:	Winter, 2020 (v1)									
6		10.0.0	e., 2020 (12)						-			_
7	Pi	roject Title:	Reader Example, Volume 1,	page 155 (3.29),	3-D Principal St	resses)	1	1 8			
8							***************************************					
9		Variable	Description	Value	Units	***************************************			Units Re			
10		ilnput	Input Units	1	1 = US, 2 = SI				US	SI		
11		iOutput	Output Units	1	1 = US, 2 = SI			σ, τ	$10^3 lb/in^2$	МРа		
12		ioption	Analysis Option	1	1 = Stress, 2 =	Strain		<i>E</i> , <i>G</i>	10 ⁶ lb/in ²	GPa	_	
13 14		Material Pr	onerties					***************************************				
15		Variable	Description	A-Basis	B-Basis	Units						
16		E	Young's Modulus	10.3	10.3	Msi						
17		G	Shear Modulus	3.9	3.9	Msi						
18		$\sigma_{\scriptscriptstyle {\it yT}}$	Yield strength - tension	68	70	Ksi						
19		$\sigma_{\it uT}$	Ultimate strength - tension	78	80	Ksi						
20		$\sigma_{ extit{yC}}$	Yield strength - compressio	-70	-73	Ksi			And the state of t			
21		$\sigma_{\it uc}$	Uultimate strength - compr	-78	-80	Ksi	******************************					
22		τ_y	Yield strength - shear	35.25	35.25	Ksi				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
23		τ_u	Ultimate strength - shear	46	48	Ksi					-	
24 25		Safety Facto	O.C.									
26		Variable	Description	Value	Units							
27		SF _v	Safety Factor - yield	1.1	1						-	
28		SF "	Safety Factor - ultimate	1.5	1							
29		u u	,									
30												
31	Х	Option 1:	Applied Stress State									
32 33		A !!! C+	C44-									
34		Applied Stro Variable	Description Description	Value	Units							
35		σ _{xx}	Stress (σ_{xx})	20	Ksi							
36		σ_{yy}	Stress (σ_{yy})	40	Ksi						-	
37		σ_{zz}	Stress (σ_{zz})	-20	Ksi							
38		τ _{yz}	Stress (τ _{yz})	20	Ksi							
39		τ_{xz}	Stress (τ _{xz})	-60	Ksi							
40		τ_{xy}	Stress (τ _{xy})	-40	Ksi							
41									0.000			
42		0.00			A				***************************************			
43 44	Х	Option 2:	Measured Strain State From	Rosettes					-			4
45		Strain Gage	Rosette								-	-
46		Variable	Description	Value	Units							
47		θ_{A}	Orientation Angle (A)		degree	1						
48		$\theta_{\mathtt{B}}$	Orientation Angle (B)		degree							
49		$ heta_{c}$	Orientation Angle (C)		degree							enconsoleranos.
50		θ	Gage Rotation Angle		degree							
51			1									
52 53		Measured S Variable	Description	Value	Units						-	
54		\mathcal{E}_{A}	Strain (A)	value	μ in/in						-	
55		ε _A ε _B	Strain (B)		μ in/in						-	
56		€ _C	Strain (C)		μ in/in							
57	1		V-7									
58											-	anananahananana.
59 0			ILE									

Α	В	С	D	E	F	G	Н	I	J	K	L	ΜN
1	3.5.47	TI AD D		E 1 G	4 7	•						+
2			roject (#2) - Metallic									\perp
3	SE-16	0A Aerospa	ce Structural Analysis, Uni	versity of Califor	nia, San Dieg	o (Copyright J.	.B. Kosmatko	a, 2020)			-	+
5		Version:	Winter, 2020 (v2) - Input: US	, Output: US/SI								
6											 	
7			John Kosmatka A0123456789								-	
9		student ib.	A0123430783								+	+-
10	P	roject Title:	Reader Example, Volume 1,	page 155 (3.29), 3	-D Principal Str	esses						1
11												
12	INPUT	ECHO:				ı						_
13		Variable	Description	Value	Units			Units Re	foronco	-	-	_
15		ilnput	Input Units	value 1	1 = US, 2 = SI			US	SI		+	+-
16		iOutput	Output Units	1	1 = US, 2 = SI		σ, τ	$10^3 lb/in^2$	MPa		+	+
17		Ioption	Analysis Option	1	1 = Stress, 2 = 5	Strain	E, G	10 ⁶ lb/in ²	GPa		+	+
18		10 4 11 11		_							+	+
19		Material Pro	operties									
20		Variable	Description	A-Basis	B-Basis	Units						
21		E G	Young's Modulus Shear Modulus	10.3000	10.3000	Msi				+	1	+
23		$\sigma_{y\tau}$	yield strength - tension	3.9000 68.0000	3.9000 70.0000	Msi Ksi				+	+	+
24		σ_{yT} σ_{uT}	ultimate strength - tension	78.0000	80.0000	Ksi				+	+	
25		σ_{yc}	yield strength - compression	-70.0000	-73.0000	Ksi				1	1	T
26		σ_{uc}	ultimate strength - compres	-78.0000	-80.0000	Ksi						
27		τ_y	yield strength - shear	35.2500	35.2500	Ksi						
28		τ_u	ultimate strength - shear	46.0000	48.0000	Ksi						
29 30		Safety Facto	nrc .								-	+
31		Variable	Description	Value	Units							+
32		SF _v	Safety Factor - yield	1.1	1						+	
33		SF u	Safety Factor - ultimate	1.5	1							
34												
35		Applied Stre		V. I	11.1							
36 37		Variable	Description	Value	Units						-	
38		σ _{xx}	Normal Stress - x Normal Stress - y	20.0000 40.0000	Ksi Ksi						-	+
39		σ_{yy} σ_{zz}	Normal Stress - z	-20.0000	Ksi						+	+
40		τ _{vz}	Shear Stress - yz	20.0000	Ksi						+	+
41		τ _{xz}	Shear Stress - xz	-60.0000	Ksi						1	
42		τ_{xy}	Shear Stress - xy	-40.0000	Ksi							
43											 	
44	OUTPL	IT.										
46		J1.										
47	1.)	Principal Str	ess State									
48		.,			_	_						+
49		Variable	Description Dringinal Strossos	1 62 9255	2	3 2005	Units				-	+
50 51		σ_{p}	Principal Stresses	-63.8255 -0.6053	6.4350 0.4488	97.3905 -0.6574	Ksi 1			+		+
52		{Φ}	Eigenvector {Q}	-0.0807	0.4488	0.6116	1				+	+
53		(-)	3 (7)	-0.7919	-0.4232	0.4402	1			1	1	
54												П
55		Variable	Description	Value	Units							+-
56		τ_{max}	Maximum Shear Stress	80.6080	Ksi						-	+
57 58	<u> </u>									+	-	+
59		8	×10 ⁴							+	+	+-
60		0										
61		6										+
62 63	 										1	+
64		4	/								+	+
65												
66		2		\ /			_					
67	<u> </u>		//	V		\						
68 69	-	tau (Ksi)	-				_	<u> </u>		+	1	+
70	-	tan		/						1	+	+
71		-2									<u> </u>	

Δ	В	С	D	E	F	G	Н	ı	J	K		ΜN
72	<u> </u>			/	' ' '	Ĭ,	' '' '	'	,	K		10110
73		-4				//						
74		-4			\smile							
75		_										
76		-6					-					
77												
78		-8		$\overline{}$								
79			-8 -6 -4 -2	0 2	4 6	8 10	4					
80				sigma (Ksi))	×	:10 ⁴					
81												
82	2.)	Allowable S	trengths				1		ı	ı		_
83			5									+
84		Variable	Description	A-Basis	B-Basis	Units						+
85		σ _T *	Allowable Tension	52.0000	53.3333	Ksi						+
86		σ_{c}^{*}	Allowable Compression	-52.0000	-53.3333	Ksi						_
87		τ*	Allowable Shear	30.6667	32.0000	Ksi						\perp
88		τ*	Allow Shear Tresca (Mixed)	26.0000	26.6667	Ksi						\perp
89	21		f . (a.c.)									ш
90	3.)	Margin of S	afety (MS)						I	I		
92		Adiminarum A	Annain of Cafotu	Daukina	Tuosao*	Von Mises						+
93			largin of Safety	Rankine	Tresca*							+
-			Min Margin of Safety (A Basi	-0.4661	-0.6775	-0.6286						+
94		MS _{min} (B)	Min Margin of Safety (B Basi	-0.4524	-0.6692	-0.6190						\perp
95		4 11 151	St. 1. 5. (245. 0). 4. D									+
96 97			ess State for (MS=0) - A Basis	Danisia -	T*	Man Bainna	I I a i b a					+
		Variable	Description	Rankine	Tresca*	Von Mises	Units					+
98		σ_{xx}	Normal Stress - x	10.6787	6.4510	7.4286	Ksi					+
99		σ_{yy}	Normal Stress - y	21.3573	12.9020	14.8571	Ksi					+
100		σ_{zz}	Normal Stress - z	-10.6787	-6.4510	-7.4286	Ksi					+
101		τ_{yz}	Shear Stress - yz	10.6787	6.4510	7.4286	Ksi					+
102		τ_{xz}	Shear Stress - xz	-32.0360	-19.3529	-22.2857	Ksi					+
103		τ_{xy}	Shear Stress - xy	-21.3573	-12.9020	-14.8571	Ksi					\perp
104		A !!! C4	C++- f (NAC-O) D. Di-									+
105			ess State for (MS=0) - B Basis	Danista -	T*	\/	11					+
106		Variable	Description	Rankine	Tresca*	Von Mises	Units					+
107		σ_{xx}	Normal Stress - x	10.9525	6.6164	7.6190	Ksi					+
108		σ_{yy}	Normal Stress - y	21.9050	13.2328	15.2381	Ksi				 	+
109		σ_{zz}	Normal Stress - z	-10.9525	-6.6164	-7.6190	Ksi				 	+
110		$\tau_{\gamma z}$	Shear Stress - yz	10.9525	6.6164	7.6190	Ksi					+
111		τ _{xz}	Shear Stress - xz	-32.8574	-19.8492	-22.8571	Ksi				 	+
112		τ_{xy}	Shear Stress - xy	-21.9050	-13.2328	-15.2381	Ksi					\perp
113		* N-4	Ab - To Cuit-ui- Al - 24	-i	lations don 1							+
114		" Note: For	the Tresca Criteria; the Mar	• •		-		-b1= *1c\				+
115			for pure tension, MS is the								 	+
116			for pure compression, MS is									+
117			for mixed stress, MS is the n	ninimum of tensio	n (σ _τ *), compre	ession (σ _c *), sh	near (τ*), and s	near ((σ _τ *-σ _c	7)/4) criteria		 	+
118 119	End of	Output										
120	Ena or	Output										
121											-	++
122											†	++
							l			l		للل