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# New Study Provides A Solution For Engineering Cellular Materials

On Jul 13, 2021

CHEMISTRY AND PHYSICS

Credit: Micah Arago.

A new study by a Swansea University academic has announced a new mathematical formula that will help engineers assess the point at which cellular materials, which are used a wide range of applications ranging from aerospace to the construction industry, will bend and buckle.

Professor Sondipon Adhikari, of the College of Engineering has published his findings in the *Proceedings of the Royal Society A*. The study details a formula that can calculate the elastic instability of cellular material, in this case hexagonal lattice material, also known as the honeycomb which is commonly used in the production of lightweight structures such as energy absorbent foams, mechanical and acoustic metamaterials and next-generation stent technology.

INTERIOR LAMPS BULB APPLICATION TABLE		
BULB	LAMP	CANDLE POWER
ABS INDICATOR	LED	
AIRBAG INDICATOR	LED	
BRAKE SYSTEM WARNING INDICATOR	LED	
CLIMATE CONTROLS	433117	0.95 <b>13</b>
CONSOLE FLOOD LAMP	T77	0.5 <b>14</b>
CONSOLE TRANSMISSION RANGE INDICATOR (TRNDL)	T194	2.0 <b>15</b>
DOOR LAMP	T579	9.0 <b>16</b>
DOOR LAMP WITH INTRUSION SENSOR EXPOSED	T578	9.0 <b>17</b>
FRONT FOG LAMP INDICATOR	LED	
HIGH BEAM INDICATOR	PCT4	0.7 <b>18</b>
INSTRUMENT CLUSTER ILLUMINATION	PCT4	0.7 <b>18</b>
LOW FUEL INDICATOR	LED	
LOW OIL PRESSURE INDICATOR	LED	
MAJUNCTION INDICATOR LIGHT	LED	
MARKING LAMP	T1037	4.4 <b>19</b>
REAR CARGO LAMP	T964	4.0 <b>20</b>
SEAT BELT INDICATOR	LED	
SECURITY ALARM INDICATOR	LED	
TRAC OFF INDICATOR	LED	
TURN SIGNAL INDICATOR	T74	0.7 <b>21</b>
VISION VANITY	6501965	4.4 <b>22</b>
VOLTAGE INDICATOR	LED	

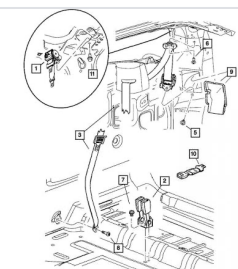
  

EXTERIOR LAMPS BULB APPLICATION TABLE		
LAMP	BULB	
BACK-UP LAMP	3157-9237W	<b>1</b>
CBMGL	W1W	<b>2</b>
FRONT FOG LAMP	9006	<b>3</b>
FRONT PARK/TURN SIGNAL LAMP/SIDE MARKER	4137NAH	<b>5 6</b>
HEADLAMP LOW BEAM	9006G3	<b>7 8</b>
HEADLAMP HIGH BEAM	9006G3	<b>9</b>
LICENSE PLATE LAMP	563	<b>10</b>
TAIL LAMP	3157-9237W	<b>1</b>


BULB APPLICATION TABLE - EXPORT		
LAMP	BULB	
FRONT POSITION LAMP	9078	<b>11</b>
SIDE REPEATER LAMP	9078	<b>12</b>

£43.43




£64.51

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Professor Adhikari’s formula, which is a simple closed-form expression, will help engineers make quick design calculations and can also be used to benchmark future experimental and numerical studies.

Professor Adhikari said: “This paper is the result of two years of sustained research. The simple closed-form expression for critical buckling stress can be viewed as the extension of the classical Euler’s critical load formula, first derived in 1757 which calculated the stress point at which a beam will suddenly bend and buckle. This new expression is a 21st century solution for engineering cellular materials that will be used in advanced engineering applications now and in the future.”

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