ACKNOWLEDGMENT

Authors are thankful to Ms. Pronita Saikia for her technical help for modeling and analysis. Authors also acknowledge computational facilities provided by the Department of Mechanical Engineering NIT Silchar. Authors also acknowledge the contributions of Mr. Amitav Chakraborty for his direct and indirect support towards the completion of the article.

REFERENCES

[1] Vijayarangan S, Ganesan N. (1993). Stress analysis of composite spur gear using the finite element approach. Computers & Structures 46(5): 869-875. https://doi.org/10.1016/0045-7949(93)90149-8

[2] Ramamurti V, Rao MA. (1988). Dynamic analysis of spur gear teeth. Computers & Structures 29: 831-843. https://doi.org/10.1016/0045-7949(88)90352-5

[3] Loutridis SJ. (2004). Damage detection in gear systems using empirical mode decomposition. Engineering Structures 26: 1833–1841. https://doi.org/10.1016/j.engstruct.2004.07.007

[4] Gligorijevic R, Jevtic J, Borak D. (2008). Material selection in gear design. Machine design Faculty of Technical Science, Novi Sad.

[5] Podzharov E, Syromyatnikov V, Navarro JPP, Navarro RP. (2008). Static and dynamic transmission error in spur gears. The Open Industrial and Manufacturing Engineering Journal 1: 37-41.

[6] Pedersen NL. (2010). Improving bending stress in spur gears using asymmetric gears and shape optimization. Mechanism and Machine Theory 45: 1707–1720. https://doi.org/10.1016/j.mechmachtheory.2010.06.004

[7] Prasad VS, Hussain SA, Pandurangadu V, Palanikumar K. (2012). Modelling and analysis of spur gear for sugarcane juice machine under static load condition by using FEA. International Journal of Modern Engineering Research 2(4): 2862-2866.

[8] Gopichand AVNL, Sharma KP, Kumar KP, Sainath K, Aravind I. (2012). Design of spur gear and its tooth profile. International Journal of Engineering Research and Applications 2: 820-827.

[9] Mahendran S, Eazhil KM, Kumar LS. (2014). Design and analysis of composite spur gear. IJRSI I(VI): 42-53.

[10] Pawar PB, Utpat AA. (2015). Analysis of composite material spur gear under static loading condition. Materials Today: Proceedings 2: 2968–2974. https://doi.org/10.1016/j.matpr.2015.07.278

[11] Desai UM, Patel DA. (2015). Modelling and stress analysis of composite material for spur gear under static loading condition. International Journal of Advances in Production and Mechanical Engineering 1(2): 1-6.

[12] Dhaduti SC, Sarganachari SG. (2015). Review of composite asymmetric spur gear. International Journal of Engineering Research 4(2): 73 – 75.

[13] Rajaprabakaran V, Ashokraj R. (2014). Spur gear tooth stress analysis and stress reduction. IOSR Journal of Mechanical and Civil Engineering 38-48.

[14] Gupta K, Chatterjee S. (2018). Analysis of design and material selection of a spur gear pair for solar tracking application. Materials Today: Proceedings 5(1): 789-795. https://doi.org/10.1016/j.matpr.2017.11.148

[15] Gupta K, Chatterjee S. (2015). Effect of pressure angle of spur gears on bending and contact stresses: A comparative study using finite element software. International Journal of Advance Research in Science and Engineering 4(sp.1): 517-526.

[16] Cui Y, Zhang Q, Han W, Zhao D. (2016). Fatigue life analysis of spur gears with precise tooth profile surfaces. Mathematical Modelling of Engineering Problems IIETA 3(2): 81-86. https://doi.org/10.18280/mmep.030207

NOMENCLATURE

The following are the generally used gear nomenclatures to carry out the different formulations in the calculation [15].

N_P, N_G	Number of teeth on Pinion and Gear
m	Module
p	Circular pitch
P	Diametral pitch
d′	Pitch circle diameter
d_a	Tip circle diameter
d_b	Base circle diameter
d_t	Root circle diameter
ϕ	Pressure Angle
h_a	Addendum
h_f	Dedendum
c	Clearance
h_t	Whole depth
s	Tooth thickness on pitch circle
r_A	Addendum circle radius
ω_1	Angular velocity of pinion
v	Pitch line velocity
α	Half angle of tooth
σ	Bending Stress on tooth fillet
T	Torque transmitted
B	Face width
y	Lewis form factor