Mechanical behavior of materials

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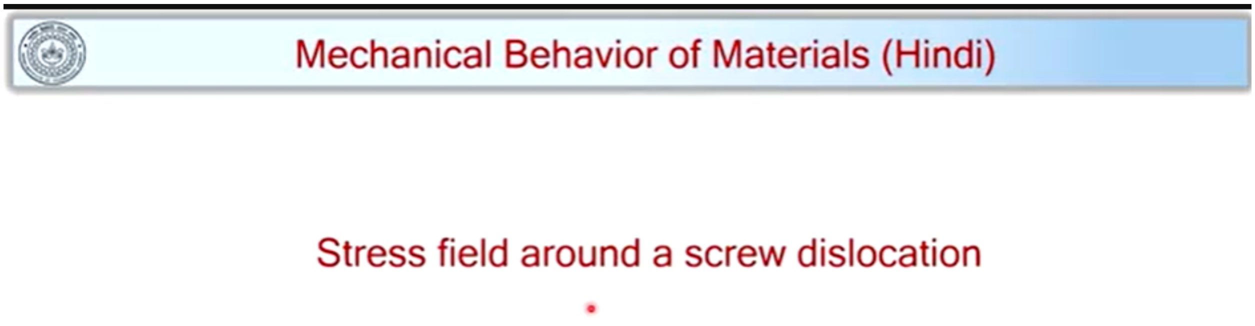
Week-6

Lecture-30

Stress Field around a Screw dislocation



Namaskar phir se swagat karta hoon aapka is course mein jiska naam Mechanical Behavior of Material hai jisko hum Hindi mein padhenge. Last part mein humne dekha tha ki koi bhi Dislocation par kya stresses lagte hain agar mere paas ya kya forces lagte hain agar mere paas kuch external stress hai crystal pe act kar raha hai. To is part mein hum dekhenge ki **Stress Field Around a Screw Dislocation** kya hoti hai yani screw dislocation jo hai uske around yani uske sabhi aur kya stress field hoti hai yeh hum is part mein janenge.

To pehle Screw Dislocation dekh lete hain humne yeh kuch schematics dekhe the kuch diagrams humne nikali thi Screw Dislocations ki to aap dekhenge yahan pe kuch offset humne mark kiya hai yeh hamara Displacement Vector hai aur yeh jo line hai yahan par inside andar mein jo line hai yeh hamare Tangent Vector hai isko mark kar lete hain yeh meri Tangent Vector hai aur jo displacement hai kuch is direction mein aap dekhenge yeh displacement jo hai isko main Burgers Vector ka naam de raha aur is yeh jo Burgers Vector hai yeh parallel hai mere Tangent Vector ke saath. To yeh mere dislocation screw dislocation ki vyakhya hai.

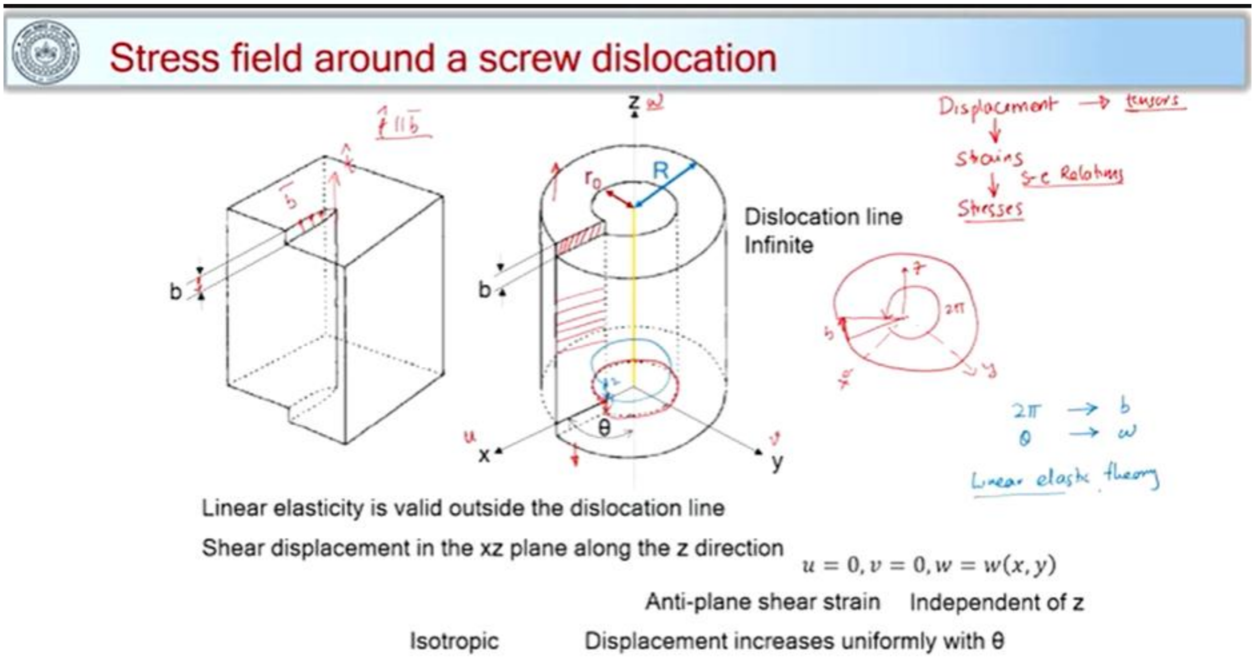
Yahi Screw Dislocation humne Volterra Cut se bhi dekha tha humne de dekha tha kuch ek cylinder aise hai aur abhi agar main is cylinder ke kuch coordinate access mark kar leta hoon x, y aur z is direction mein maine mark kar liye aur jo Dislocation Line Vector hoga ya Dislocation Tangent Vector hoga wo along mein z direction yani ye jo cylinder ka axis hai iske direction pe mark kar raha hoon aur aap ne padha hi tha ki yeh jo screw dislocation main taiyar karunga yeh main ek Volterra Cut karunga is cylinder ko aur shear karunga z direction mein yani axis ke direction mein uske wajah se kya hoga jo mera Burgers Vector hai wo parallel ho jayega Tangent Vector pe. To ye jo mera Burgers Vector hai ne mark kiya hai maine to yeh jo displacement hai yeh displacement mera Burgers Vector hai aur ye parallel karunga main Tangent Vector ke saath to Tangent Vector mark kar lete hain yahan pe to ye jo Tangent Vector hai isko main kahunga Dislocation Line aur ye jo Tangent Vector hai yani aap ye cylinder hum consider karenge infinitely long aisa ya anant ke taraf ja rahi hai yeh dislocation line is tarah se hum karenge to to hamara jo mathematical formulation hoga wo aasaan ho jayega. To hum consider karte jo dislocation line hai yeh meri infinite hai yani mera crystal jo hai wo infinite hai aur mere displacement kuch is tarah se.

To abhi hum jante hain ki displacement kya hai to humne dekha tha ki x direction pe main displacement consider karunga u, y direction pe displacement consider karunga v aur z direction pe displacement consider karunga w. Abhi jaise maine bataya ki ye jo Burgers Vector hai displacement vector hai par jab bhi koi deformation ya jab bhi koi defect aata hai material mein wahan pe jo displacements honge atoms ke aap ye maan ke chaliye ki ye atoms hai yahan pe displace hai. To abhi kuch dimensions mark karte hain jaise maine yahan par ek r_0 mark kiya hai aur ye jo r hai yeh mark kiya hai to yeh jo r_0 hai yeh mera bata raha hai yeh Dislocation ka Core. Yahan par jo hum jo Elasticity Theory hai wo applicable nahi rahegi aur ye yahan par jo iske r_0 ke bahar jo hai wo mera Continuum Media hai aur is Continuum Media mein main Theory of Elasticity apply kar sakta hoon. To Linear Elasticity jo valid hai wo is r_0 ke bahar hi rahegi Dislocation Line ke kareeb main yeh theory apply nahi karunga yani jo displacement hai yahan pe yeh mere Linear Displacement hai Elastic Displacement hai. To main Elasticity Theory se Stress Field nikalne ja raha hoon to sabse pehle hum is tarah se is approach pe jayenge sabse pehle main Displacement nikalunga. Maine Displacement nikala hai uske baad mein Displacement se main Strains nikalunga aur is Strains ko agar main Elastic Medium consider kar raha hoon isko to is Strains ko main Stresses ke saath compare kar sakta hoon ya Stresses mein convert kar sakta hoon agar mujhe Stress Strain Relations pata hai to Stress Strain Relation agar mujhe pata hai to main isko convert kar sakta hoon. To sabse pehle hum Displacement jab nikalenge to main Displacement Tensors ki baat kar raha hoon main to Tensoral Form se nikalunga humne dekhe the Displacement Tensor kya hai Strain Tensor kya hai aur Stress Tensor kya hai.

To aaiye chaliye dekhte hain ki ye Displacement kis tarah se hai. To yahan par aap dekhenge ki jo Shear Displacement hai yeh sirf mere xz plane mein hai. xz plane kaun sa hai agar aap ye mera x direction hai aur ye mera z direction hai aap dekhenge ye jo mere displacement hai kuch is tarah se yahan pe hi mere displacement hai is plane mein displacement hai yeh jo plane hai yahi mera displace ho raha hai aap dekhenge ki maine yeh displace kiya hai yeh part above aur yeh part below to aapko displacement jo mil raha hai wo sirf xz plane mein mil raha hai yahan par hi mil raha hai displacement aur yeh jo displacement hai yeh along z direction hai. To yahan par aap dekhenge ki x direction mein displacement kya hai x direction mein mere displacement shunya hai zero hai y direction mein jaise v hai mera y direction mein displacement wo bhi zero hai aur w direction mein w z direction mein mere displacement se w aur yeh jo w hai yeh mere function hai x, y se to isko bhi hum samjhenge jaise aap dekhenge yeh jo displacement hai to maine kuch is tarah se shear kar liya hai yeh agar aap dekhenge ki is tarah se main yahan par move ho raha hoon is xy plane pe maine θ degree mein yahan se move ho raha hoon to main z direction par mere displacement mil rahe hain kuch is tarah se samjhe mere paas kuch yeh initial position hai meri initial position hai aur main kuch is tarah se move karke aa raha hoon to main ek position par pahunchunga jo b distance apart rahegi yahan par to yahan par main 2π agar move karke aa raha hoon to main kuch w yani z direction pe upar chadh raha ho to yeh mera xy plane hai ye mera xy plane hai to main agar xy plane mein move karta hoon to mera mujhe displacement mil raha hai z direction yani mujhe w displacement mil raha hai isliye main is ko function of x, y likh raha hoon.

To aap dekhiye yahan se maine shuruat ki isko yahan se bhi samajh sakte achche se agar main is position se chalu kar raha hoon aur main rotate kar raha hoon ya xy plane mein move kar raha hoon aap dekhenge ki main yahan se yahan tak aake pahunch gaya aap dekhenge yeh mera offset ho gaya yahan par mujhe displacement mil gaya. Abhi aap is tarah se samajh sakte hain isko bhi agar main phir se rotate karunga is plane mein to main ek above plane par aakar pahunch jaunga to agar main kuch is tarah se rotate karta hoon thoda color change kar lenge hum to main kuch is tarah se agar yahan se rotate karunga to main kuch is tarah se above jakar pahunchunga to mera yeh zero position tha yeh mera first position tha ye mera second position tha. To aap dekhenge jo displacement hai yeh mere displacement mein xy plane par jab move ho raha hoon to yeh displacement badh raha hai mere z direction mein aur aap dekhenge ki jo main zero se one gaya to ye jo displacement the wo same the one se two gaya to mere displacement bhi rahenge aur same thing wahi cheez aapko yahan par bhi dikhai degi agar main yahan se move ho raha hoon yahan pahunch raha hoon to yeh jo displacement hai aur yeh jo displacement hai wo same rahenge agar main 2π se move ho raha hoon to jo displacement mujhe milenge wo saare same rahenge. To yeh jo condition hai yeh condition isse main bol sakta hoon ki ye jo w hai wo independent of z hai yani agar main z ke direction mein main move ho raha hoon to mujhe jo displacement milengi wo z se independent rahenge kyunki main agar yeh one to two position consider kar raha hoon ya zero to one position consider kar raha hoon ya yeh position se yeh position bhi consider kar raha hoon to mera jo w hai wo independent rahega z se isko hum kehte hain Anti-plane Shear aur yeh jo Strain develop hoga uske wajah se isko kehte hain Anti-plane Shear Strain.

To agar aapko Anti-plane Shear Strain pata hai to hum directly iska solution abhi hi nikal sakte par hum isko thoda aur detail mein janenge. To agar main θ position move ho raha hoon yahan par to agar main θ position move ho raha hoon to θ position is plane mein move ho raha hoon main xy plane par to xy plane par agar main move ho raha hoon to agar main kuch is tarah se likh paunga mere displacement isko mark kar lete agar main 2π move hota to mujhe displacement mil raha hai Burgers Vector ke kareeb to agar main θ move honga to mujhe agar displacement milenge to maan lete hain ye x to ya jo bhi hai isko is tarah se samjhega yeh mujhe jo displacement milenge yeh is tarah se rahenge x nahi milunga main yahan par humne w likha hai to mujhe w displacement milenge isko isko w likh lete hain. To aaiye chaliye dekhte hain ki ye displacement kis tarah se mere paas $u = 0$ hai $v = 0$ hai aur w function hai x, y ka aur ek important cheez yahan pe aap dekhenge ki ye jo material hai yeh isotropic hai humne dekha tha ki Isotropic Material kaun se hote hain jo material jinki properties mere direction se independent hai ya direction ki functions nahi hai aur yeh jo displacement hai wo uniformly increase ho raha hai θ se kyunki hum Linear Elastic Theory consider kar rahe to hum yahan par likh sakte hain Linear Elastic Theory hum consider karenge aur yeh jo theory hum apply karne wale yeh hamare Dislocation Core ke bahar yahan par maine r_0 mark karke rakha hai iske bahar hi hum apply karenge jiske andar yeh theory valid nahi rahegi.



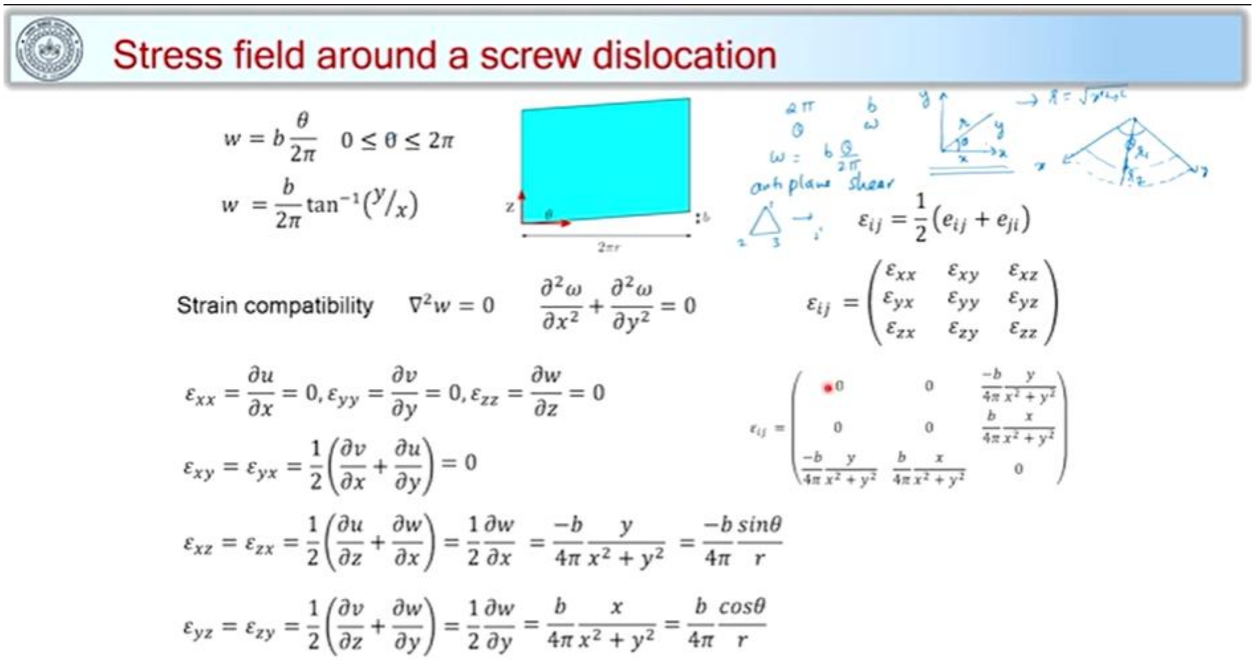
To mere paas kuch w is tarah se aayega ye humne dekha tha b w ka to hum dekhenge ki ye jo θ ki value hai main yahan par yeh θ hai to yeh θ ki value kuch is tarah se hai zero se 2π ke beech mein to main kuch is tarah se samajh paunga yeh mera pehla position tha initial position tha agar main $2\pi r$ yani circumference complete karta hoon to main kitna distance move kar raha hoon w direction mein main b distance move kar raha hoon. To humne kuch is tarah se samjha tha agar mera π move karta hoon to mere paas b aa jata hai aur main θ move karunga to mere paas kuch w aayega to main w ko is tarah se likh sakta hoon $b\theta/2\pi$ to mere paas w ki jo value aayegi kuch is tarah se aayegi aur is isko hum is tarah se bhi samajh sakte agar main θ ki value consider karunga to agar main ye xy plane consider karunga aur θ ki value consider karunga yahan par to θ ko main kuch is tarah se likh sakta hoon yeh y ho gaya mera aur ye x ho gaya so main θ ko kuch $\tan^{-1}(y/x)$ likh sakta hoon yahan pe aur yeh jo value hai yeh r hai radius hai radius jaise humne dekha tha yahan pe ki hamara xy plane tha ye θ ho gayi aur hum dekhenge ki displacement yeh r direction mein yani main r is tarah se badh raha hai mere r to yahan par agar main kuch r fix kar lu ye yeh r_1 ho gaya ye r_2 ho gaya to aap dekhenge ki jo displacement hai ye jo displacement hai yeh independent of r hai yani aap dekhenge agar yeh displacement sirf linearly vary karenge mere θ ke saath na ki r ke barabar to yeh bhi ek criteria yahan pe.

To yeh jo displacement hai z direction pe w jo main maan ke chal raha hoon main usko is tarah se likh sakta hoon $b/2\pi$ θ ki value main yahan se likh sakta hoon $\tan^{-1}(y/x)$ yeh mere paas value aa gayi. Abhi hum dekhenge ki jab yeh yeh jo compatibility condition hai strain ki yeh jo term hai yeh shunya honi chahiye ye yeh condition kab aati hai meri condition aati hai Anti-plane Shear mein yeh meri condition hai Strain Compatibility ke liye to hum isme jayenge nahi par aapko ye yaad rakhna hai ki agar Strain Compatibility ki baat kar raha hoon to meri kuch is tarah se condition aayenge Strain Compatibility yane isko thoda sa samajh lete hain agar mere paas kuch ek ek dimension hai yeh hai aur isko main deform kar raha hoon deform yane compress kar raha hoon ya tension de raha hoon ya shear strain de raha hoon to ki kuch is tarah se deform hoga yani 1 2 3 hai to ye 1’ 2’ 3’ zaroori nahi hai inki length aur se same deformation ho but Strain Compatibility ye kehta hai ki ye kuch is tarah se nahi hona chahiye yani cross over nahi hona chahiye jaise mere paas ye 1’ yahan pe aaya 1’ yahan pe 2’ 3’ is tarah se aaya to yeh cross over nahi hona chahiye ya kuch gaps nahi rehni chahiye is tarah se nahi aana chahiye isko hum kehte hain Strain Compatibility aur wah yeh jo condition hai satisfy hogi jab yeh yeh identity satisfied rahegi ya hamari Strain Compatibility satisfied rahegi.

Aaiye chaliye kuch abhi Strain ke liye likhte hain to main Strain ke liye jab likhunga tab Strain ki vyakhya maine kuch is tarah se ki thi Strain ko maine is tarah se likha tha yeh mera component hai Strain ka aur yeh mera Strain Tensor hai yahan par mere paas nau components hai aur yeh jo hai e_{ij} aur e_i yeh mere displacement hai to humne dekha tha pehle hum displacement dhoondhenge phir displacement se Strain aayenge Strain se Stress aayenge mere nau components hai abhi nau components mein se mujhe pata hai ki chhe chhe hi independent hai to mujhe chhe components dhoondhne hai aur is chhe component agar mujhe pata chalte to main Stress nikal paunga. To chaliye dekhte hain yeh jo component hai main kis tarah se nikalun main displacement se nikalun to humne dekha tha ki ϵ_{xx} yeh kya hota hai $\partial u/\partial x$ yahan par u ki value shunya hai yani displacement shunya hai x ke direction par to yeh jo value hai yeh shunya ho jayegi usi tarah se ϵ_{yy} ye $\partial v/\partial y$ hai aur v ki value bhi shunya hai to hum dekhenge ki yeh bhi value shunya ho jayegi aur ϵ_{zz} aapne dekha tha ki $\partial w/\partial z$ hai par humne bola tha ki yeh jo displacement hai z direction par w yeh independent hai mere z direction se to yeh bhi jo value hogi yeh bhi shunya aayegi mere paas ye jo teen Normal Strain components hai yeh saare shunya ho jayenge.

Abhi hum ϵ_{xy} aur ϵ_{yx} is tarah se kuch define kiye the to hum main is tarah se likh sakta hoon $1/2(\partial v/\partial x + \partial u/\partial y)$ to aap dekhenge ki v ki value shunya hai aur u ki value bhi shunya hai to yeh jo value aayegi yeh bhi zero aayegi. Abhi hum dekhte hain kuch aur Shear Strain $\epsilon_{xz} = \epsilon_{zx}$ isko hum likh sakte hain $1/2(\partial u/\partial z + \partial w/\partial x)$ to abhi aap dekhenge ki u ki value to shunya hai ye zero ho jayega to yeh jo term hai yeh $1/2\, \partial w/\partial x$ to yeh kuch is tarah se aayega abhi mere paas w ki value is tarah se agar main isko differentiate karta hoon x se to mere paas kuch is tarah se relation aayega agar main is w ko main differentiate karta hoon x se to mere paas kuch is tarah se equation aayega $-b/4\pi \cdot y/(x^2 + y^2)$ ab hum is $x^2 + y^2$ ko is tarah se likh sakte agar aap yeh dekhenge ye ye dekhenge to main r ko likh sakta hoon $\sqrt{x^2 + y^2}$ to main is term ko yeh jo term hai $y/(x^2 + y^2)$ upon $x^2 + y^2$ ko kuch is tarah se likh paunga $\sin\theta/r$ to ye jo value hai ye r^2 ki value ho aur y/r y/r mera aa jayega $\sin\theta$ to main kuch is tarah se likh paunga agar main isko is tarah se likhu y/r aur $1/r$ to y/r aa jayega $\sin\theta$ aur yeh value is tarah se aayegi to mere paas aa jayega $-b/4\pi \cdot \sin\theta/r$ is is relation se.

Isi tarah se kuch aur Strain components hai ϵ_{yz} aur ϵ_{zy} to yeh aa jayenge $1/2(\partial v/\partial z + \partial w/\partial y)$ v to shunya hai yahan pe aur mere paas w hai aur is w ko main differentiate karunga y ke hisaab se to mere paas kuch is tarah se relation aayega $b/4\pi \cdot \cos\theta/r$ mere paas saare Strains ki value aa gayi aur is saare Strains ki value main kuch is tarah se likh sakta hoon ϵ_{ij} ko main is tarah se likh sakta hoon mere paas saare jo Normal Strains thi saari value shunya hai ϵ_{xy} ϵ_{yx} yeh bhi shunya hai aur mere paas jo value hai hogi ϵ_{xz} ϵ_{zx} ϵ_{yz} aur ϵ_{zy} yeh jo value hai ϵ_{xz} ϵ_{yz} ϵ_{zx} ϵ_{zy} yeh values aa jayegi aur aap dekhenge ki yahan pe mere paas kuch kuch Normal Strains yahan par shunya hai.



Abhi hum is Strains ko Stresses mein convert karenge uske liye humein chahiye Stress Strain Relation humne Stress Strain Relation dekhe the humne dekha tha ki yeh Shear Modulus hai Shear Modulus se main Normal Strains ke saath relate kar sakta hoon aur yeh λ mera Lame's Constant hai humne relation padhe the jab humne Stresses ko Strains ke dwara likha tha tab hamare paas abhi yeh jo values hai agar yeh values main yahan par rakhta hoon to mere paas ϵ_{xx} σ_{xx} ye Stresses ki value bol raha hoon σ_{xx} σ_{yy} σ_{zz} ye Normal Stresses jo hai wo saare shunya ho jayenge mere paas jo xy hai τ_{xy} hai yeh bhi yani ϵ_{xy} shunya hai to yeh bhi shunya ho jayega to τ_{xy} aur τ_{yx} shunya ho jayenge mere paas value aa jayegi τ_{xz} ki to yahan par main ϵ_{xz} ki value rakhunga ϵ_{xz} yani ye value to main agar yahan par rakhunga to mere paas aa jayegi τ_{xz} ki value yani Shear Stress ki value yeh main is kuch is tarah se likh sakta hoon $-Gb/2\pi \cdot \sin\theta/r$ usi tarah se τ_{yz} ye jo other Shear Stress hai τ_{yz} ye jo value agar main yahan par rakhunga ϵ_{yz} mein mere paas Shear Stresses ki value aa jayegi to mere paas ek Stress Tensor aa jayega to Stress Tensor kuch is tarah se yahan par aap dekhenge ki Normal Stresses saare shunya hai to yahan par likh lete hain Normal Stresses shunya hai to yeh jo condition hai aap dekhenge ki yahan par koi Hydrostatic Stress State nahi rahegi mere paas sirf Deviatoric State rahegi to sirf mere paas Deviatoric State rahegi aur yeh aapko yaad rakhna hai mere paas koi Hydrostatic Stress State nahi rahegi sirf Deviatoric Stress State rahegi kyunki yeh jo Stress Field hai mere Screw Dislocation ke around yeh Screw Dislocation ke around jab main Stress Field nikalunga yeh jo Dislocation hai kisi aur defect ke saath ya kisi external stress ke saath interact karega to tab hum yeh values Stress State ki values hum istemaal karenge yahan par aapko yaad rakhna hai ki mera jo Dislocation Line Tangent Vector hai wo z direction pe z direction ke along hai ye yahan par yaad rakhna hai to agar mera Tangent Vector kisi aur direction pe hai to Stress State aapko usi tarah se change karni padegi to is condition ke liye hum dekhte hain abhi hum to mere paas sirf Shear Component yahan par maine likha tha mere paas sirf Shear Components hai aur mere paas koi Normal Component nahi hai to mere paas Hydrostatic Stress State hai Hydrostatic Stress State nahi hai to yahan par phir se likh leta hoon main Hydrostatic nahi hai mere paas ye Deviatoric Stress State hai.

Stress field around a screw dislocation

Stress field

$$\sigma_{xx} = 2G\varepsilon_{xx} + \lambda(\varepsilon_{xx} + \varepsilon_{yy} + \varepsilon_{zz})$$

$$\sigma_{yy} = 2G\varepsilon_{yy} + \lambda(\varepsilon_{xx} + \varepsilon_{yy} + \varepsilon_{zz})$$

$$\sigma_{zz} = 2G\varepsilon_{zz} + \lambda(\varepsilon_{xx} + \varepsilon_{yy} + \varepsilon_{zz})$$

$$\tau_{xy} = 2G\varepsilon_{xy} \qquad \tau_{xz} = 2G\varepsilon_{xz} \qquad \tau_{yz} = 2G\varepsilon_{yz}$$

$$\sigma_{xx} = \sigma_{yy} = \sigma_{zz} = 0$$

$$\tau_{xy} = \tau_{yx} = 0$$

$$\tau_{xz} = \tau_{zx} = 2G\varepsilon_{xz} = \frac{-Gb}{2\pi}\frac{y}{x^2+y^2} = \frac{-Gb}{2\pi}\frac{sin\theta}{r}$$

$$\tau_{yz} = \tau_{zy} = 2G\varepsilon_{yz} = \frac{Gb}{2\pi}\frac{x}{x^2+y^2} = \frac{Gb}{2\pi}\frac{cos\theta}{r}$$

$$\varepsilon_{ij} = \begin{pmatrix} 0 & 0 & \frac{-b}{4\pi}\frac{y}{x^2+y^2} \\ 0 & 0 & \frac{b}{4\pi}\frac{x}{x^2+y^2} \\ \frac{-b}{4\pi}\frac{y}{x^2+y^2} & \frac{b}{4\pi}\frac{x}{x^2+y^2} & 0 \end{pmatrix}$$

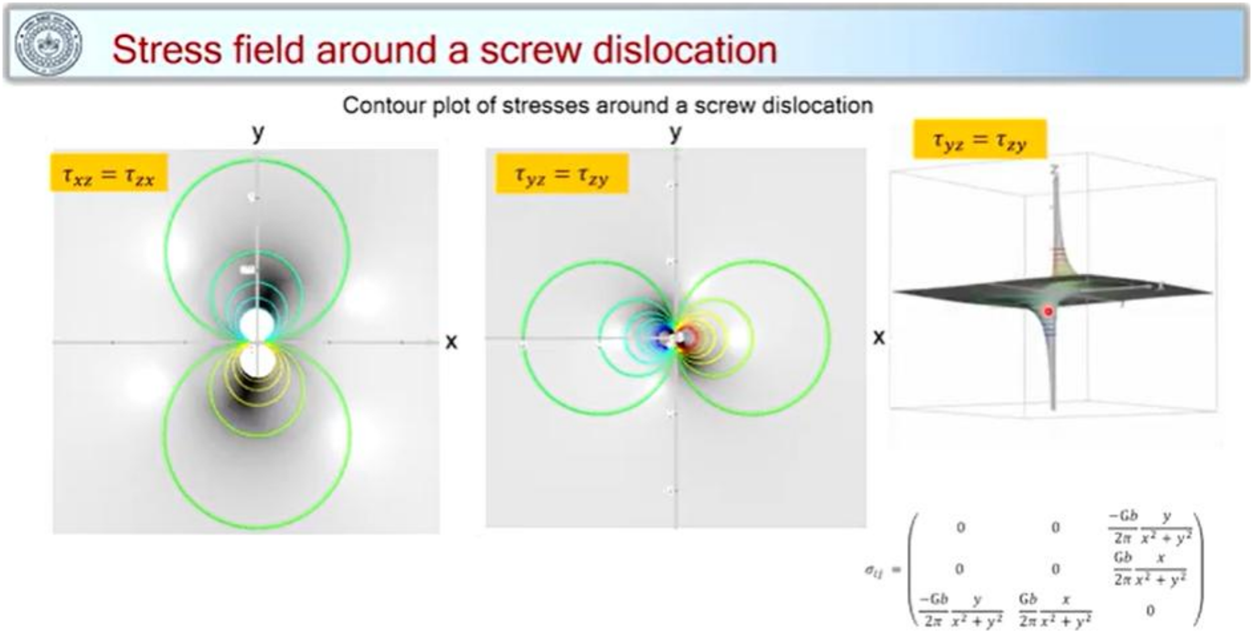
$$\sigma_{ij} = \begin{pmatrix} 0 & 0 & \frac{-Gb}{2\pi}\frac{y}{x^2+y^2} \\ 0 & 0 & \frac{Gb}{2\pi}\frac{x}{x^2+y^2} \\ \frac{-Gb}{2\pi}\frac{y}{x^2+y^2} & \frac{Gb}{2\pi}\frac{x}{x^2+y^2} & 0 \end{pmatrix}$$

$\hat{t}$ z

Hydrostatic ✗
Deviatoric ✓

Only shear component,
No normal components

To abhi hum is Stress Field ko kuch is tarah se samajh sakte hain agar main kuch Contour Plot rakhunga Contour Plot yane is Stress ki intensity kya hai mere x position se aur y position se kis tarah se change ho rahi yani mere r position se kis tarah se Stress Field change ho rahi hai Displacement change nahi ho rahi par Stress Field change ho sakti hai to aap dekhenge yeh jo x aur y plane mein maine τ_{xz} aur τ_{zx} is tarah se plot kiya hai aap dekhenge ki mere paas Deviatoric hi Stress State Field hai jo inner circle bata rahe ki mere jo Stress ki intensity zyada hai yahan pe jitna chhota circle utni Stress ki intensity zyada to yahan par bhi τ_{yz} aur τ_{zy} yeh main kuch is tarah se likh paunga ye is value se main Contour Plots nikal pa raha hoon aap koi bhi online ya koi bhi free software istemaal karke is is values ko plot karenge to aapko ek Contour Plots milenge aur kuch is tarah se milenge aapko agar main τ_{yz} ya τ_{zy} ko kuch is tarah se nikalunga to mujhe kuch is tarah se mil raha hai aap dekhenge yeh jo Stress Field hai wo change ho rahi hai mere x aur y direction se aur z direction pe ye infinite long tak rahega unki main infinite cylinder consider kiya hai yahan pe aur ek important cheez hai agar main r tends to zero karta hoon yaani main Dislocation Line ke paas pahunchta hoon to aap dekhenge ki ye jo Stress value hai wo infinity infinity ki taraf ja rahi hai yahan pe main bol sakta hoon ki mera jo Elasticity Theory hai wo valid nahi hoga ya apply nahi hoga.



To yeh humne abhi dekha is part mein abhi main yahan pe rukunga Dislocation ke Stress Field ke taraf to is part mein humne dekha hai ki jo Screw Dislocation ke around kya Stress Field rehti hai humne jaana ki mere paas sirf Deviatoric Stress Field rehti hai Hydrostatic Stress Field nahi rehti hai to iska implication kya hoga hum aage dekhenge agle part mein hum janenge ki Stress Field Around Edge Dislocation kya hoti hai yahan pe rukta dhanyavad.