

## Application of composite mechanics to composites enhanced concrete structures



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## APPLICATION OF COMPOSITE MECHANICS TO COMPOSITES ENHANCED CONCRETE STRUCTURES



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No binding. Book Condition: New. This item is printed on demand. Original publisher: Cleveland, Ohio : National Aeronautics and Space Administration, Glenn Research Center, 2006 OCLC Number: (OCoLC)688501067 Excerpt: . . . The buckling load of the un-enhanced dome, subjected to concentrated load at the crown, is shown in figure 14 where normalized values are plotted. It is seen that the buckling load is very, very high compared to the fracture load ( at least 100 times ). It is also seen that buckling load starts degrading at about 23 percent of the fracture load. This latter result is interesting because it indicates that progressive damage must initiate at about this value. Re-examination of the curves in figure 12 reveals that this is consistent with the point at which damage initiates. Note that the buckling load decreases to about 50 percent just prior to fracture. The degradation in the first four vibration modes is shown in figure 15. Insignificant or negligible degradation occurs prior to fracture. Apparently, the frequencies are not as sensitive a measure or degradation as is the buckling load. The reinforced concrete dome is enhanced with the same composite layers as is the special arch. The enhanced results are shown in figure 16 where the damage is plotted versus load for three different cases: un-enhanced, composite enhanced at the top, and composite enhanced at the bottom. It is very interesting to note that the composite enhancement at the top increases the fracture load by twofold, while that at the bottom only about 20 percent. The important conclusions are: 1 ) the load carrying capacity of reinforced concrete structures can be substantially enhanced by the judicious use of fiber composite layers and 2 ) computational simulation capabilities which are suitable combinations of composite mechanics and general finite element..



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