IMPACT LOAD DISTRIBUTION
Impact Resistant Structures

PROBLEM STATEMENT:
Design an impact resistant structure, base **20 cm X 20 cm** and max height **30 cms**, using only straws, satisfying the understated constraints and that can withstand a load falling with a certain potential energy without inflicting any damage to the bulb that will be placed at the centre of the base of the structure.
CONSTRAINTS:

1. Base of the structure, **20 X 20 cms**, will be fixed on the platform, once the platform is fixed its position will not be changed.
2. There will be a 60 watt bulb fixed to the platform and lying exactly at the centre of the base.

3. Loads will be dropped on the structure from heights **1.0 m** from the base platform, and if required height will be varied.

4. Bulb will be placed vertically below path followed by the falling load. The moment bulb breaks, the structure will be assumed to have failed(the mode of failure of structure and the breaking of bulb will bear no consequence whatsoever on the result).

5. Height of the structure **should not exceed 30 cms** measured from the base platform.

6. No straws or any part of your structure for that matter **shall lie within a cylinderical zone of diameter 10 cms centred at origin and height 15 cms.**

7. Joints and Overlaps-maximum overlap between the ends of the straws at the joints shall not exceed 2 cms under any circumstances. Minimum length of any member has to be 4 cms. Overlapping of the straws is allowed only at the ends of the straws and not in between by any mechanism whatsoever and this overlapping is allowed only if the straws involved in overlapping have at least 4 cm clearance between two overlaps or atleast 4 cm length of those straws should be without any overlap.

8. You can use as many pins as you wish at the ends (upto 2 cms from both ends). But this holds only for straws with length greater than 8 cms. After that along any straw between two subsequent joints there has to be a minimum distance of 4 cms. For straws of length greater than 4 cms (which is the minimum length of any member) and less than or equal to 8 cms, the rule is as following:
    i. One can use only two pins one at both the ends if straw is of 4 cms - 6 cms length.

ii. You can use as many pins as you wish at the ends (upto 1 cm from both ends) if the length of straws are from 6 cms - 8 cms length.
The same holds true for gluing also.

9. No two straws should be glued longitudinally.

10. Bending of straws in any way is not allowed, after impact the straws may bend but the structure which is submitted should have all straight straws.

11. Base-structure should have straws of minimum length 2 cms provided at the base making a 20 cms * 20 cms square for fixing the structure rigidly to the platform.

12. Shape-structure could be of absolutely any shape satisfying the above constraints.

13. Once the structure is weighed, you are not allowed to modify your structure in any way.

14. If the structure fails to satisfy any of the above constraints the structure will be summarily rejected.

15. Once the structure is fixed on the board, participants are not allowed to touch it and no change are allowed in any case.

MATERIALS TO BE USED:

1. Straws (provided by us after registration).

2. Pins, any standard adhesive(e.g. quickfix or fevicol etc.) can be used to join the straws and must not be applied to any part other than joints. Tape or thread must not be used under any circumstances to support the joints.

GENERAL RULES:

1. Maximum of three participants per team.

2. Each team will be provided with 2 packets of Straws.

3. Teams violating any of the above constraints will be disqualified.

4. Minimum load to be bear by the structure is 750 gms. Thereafter the choice of load would be on the participants.

5. In case of any dispute, the decision of the techfest team will be final.

WINNING CRITERIA:
Winning criteria will be the ratio of the initial potential energy of the falling load, which is withstood by the structure without the bulb placed at the centre of the structure being broken, to the self laod of the structure. The structure registering highest ratio of the initial potential energy of the falling load at this point to the self laod of the structure will

be declared winner.

Cash Prize of Rs. **20,000** to be won.

REGISTRATION:

1. Each team has to register online. A registration number will be allocated to the team on registration which shall be used for future reference.

2. Registration for outstations colleges has been closed from 15th January, 2004.

3. Teams from IIT Bombay can register and collect their straws by paying the amount of Rs. 50 from the following people:

Prakash Gupta Hostel 13, B-707	Kamal Kant Jain Hostel 4, 237	Anasua Chaterjee Hostel 10, 316