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Q8(c)

Discuss how anthropological knowledge of the human body may be used in designing equipments and articles of human use

UPSC Civil Services Mains 2022 · Anthropology GS 1 · 15 marks · Applications of Anthropology

12. Applications of Anthropology: Anthropology of sports, Nutritional anthropology, Anthropology in designing of defence and other equipments, Forensic Anthropology, Methods and principles of personal identification and reconstruction, Applied human genetics-Paternity diagnosis, genetic counselling and eugenics, DNA technology in diseases and medicine, serogenetics and cytogenetics in reproductive biology.

Core demand of the question

- Discuss how anthropological knowledge of the human body may be used in designing equipments and articles of human use
- Write about 200 words for 15 marks

Revision summary

Ergonomics applies anthropometry to tools and spaces.

Percentiles of size, not an average man, should drive design.

Heath-Carter shape and climate physiology add further constraints.

Indian defence and school furniture are live cases.

Exclude women and the small at your ethical peril.

Introduction

Ergonomics is applied biological anthropology. Body size, sit, reach, and climate decide whether a tool fits or injures.

Body

What the body file gives

- Anthropometry supplies percentiles of stature, sitting height, hand length, and hip breadth. **Hooton** and wartime **aviation** studies already fitted cockpits to men. Today the sample must include women and older workers.
- Somatotype and fat-muscle distribution, after **Heath and Carter**, help sports kit and load carriage.
- **Physiological anthropology adds heat, cold, and altitude:** clothing, tents, and oxygen for Himalayan troops.

Cases

- **Defence:** rifle stock, helmet, and parachute harness fail if they are cut to a US male mean. DRDO and Indian army surveys exist for this reason.
- **Civil:** bus seats, kitchen platforms, and school desks in India often ignore local child growth data from **ICMR**.

- **Medical devices:** prosthetic sockets need stump anthropometry. Forensic and design labs share methods.

Ethic

- Design for the 5th to 95th percentile, and for left-handers. A 'universal' European dummy is a political choice.

Flow diagram

Anthropometry -> Design percentiles

Heat cold altitude -> Design percentiles

Design percentiles -> Kit vehicle desk

Conclusion

Know the living body, then cut the tool. Anthropology's measurements, climate physiology, and variation are the brief for equipment that does not maim.

Facts & figures

Ergonomics

Fitting task and machine to human variation, using anthropometric surveys.

Percentile design

Common rule: accommodate 5th to 95th percentile of the user population.

Aviation

Cockpit geometry was an early driver of applied anthropometry in the world wars.

ICMR growth

Indian child measurements that should, but often do not, set school furniture heights.

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