

my bike- design of an adolescent bike

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## Aims and Objectives

To understand a bicycle.

To understand the user(s) psychology.

To explore the new possibilities of extending usability by value addition to the existing product.

To evolve a form that may incorporate the function and emotion.

## Users

Primary user- adolescents (primarily boys) of age group 9- 14 yrs

Secondary user- indirect user- parents (decision makers)

Tertiary user- cycle repairers

## Data Collection

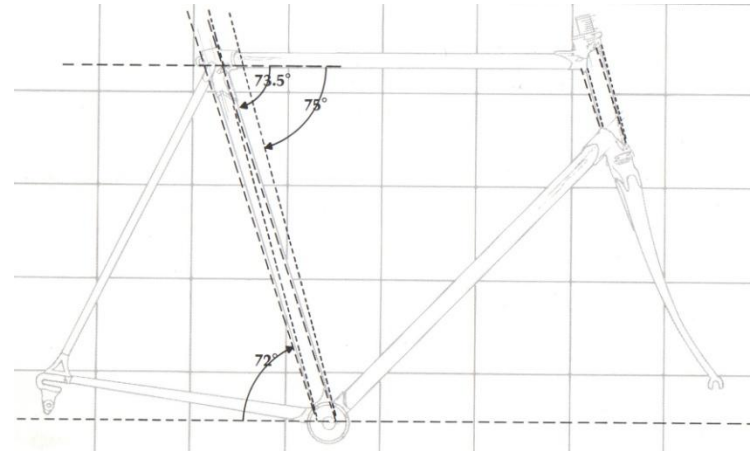
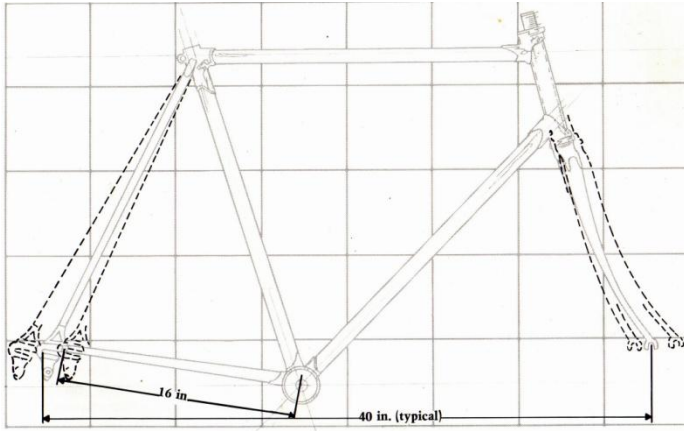
Library search

The focus of the search was to understand bicycle, the principle of bicycling and to get the history & technical details about the product

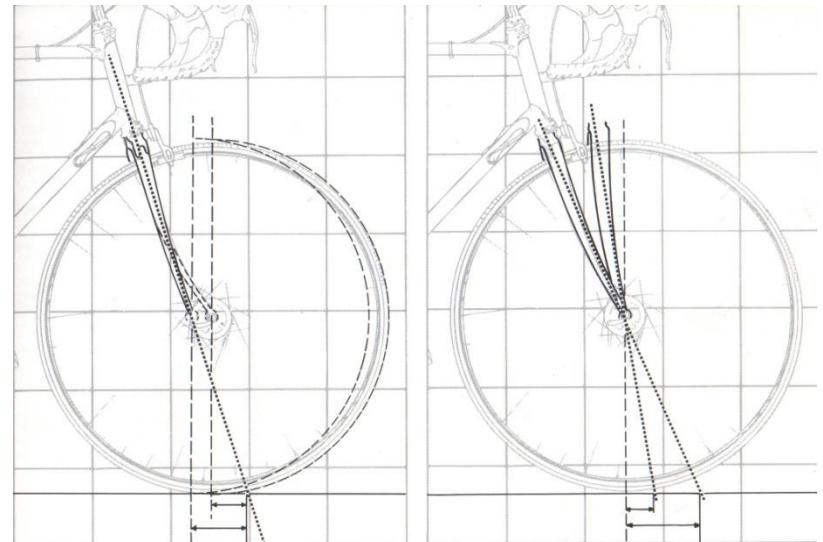
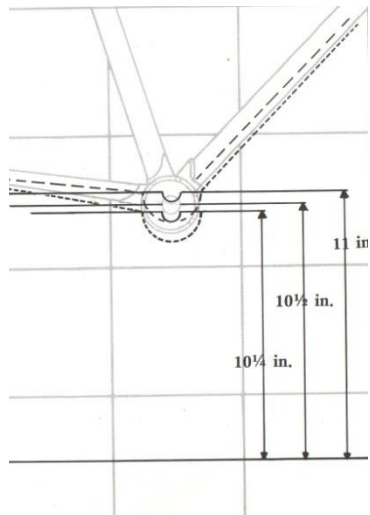
Visits to HERO cycle and ATLAS cycles

Interaction with industry people

Regular interaction with cycle repair shops and users



## Critical considerations





Trends ...

Futuristic bikes





Trends ...



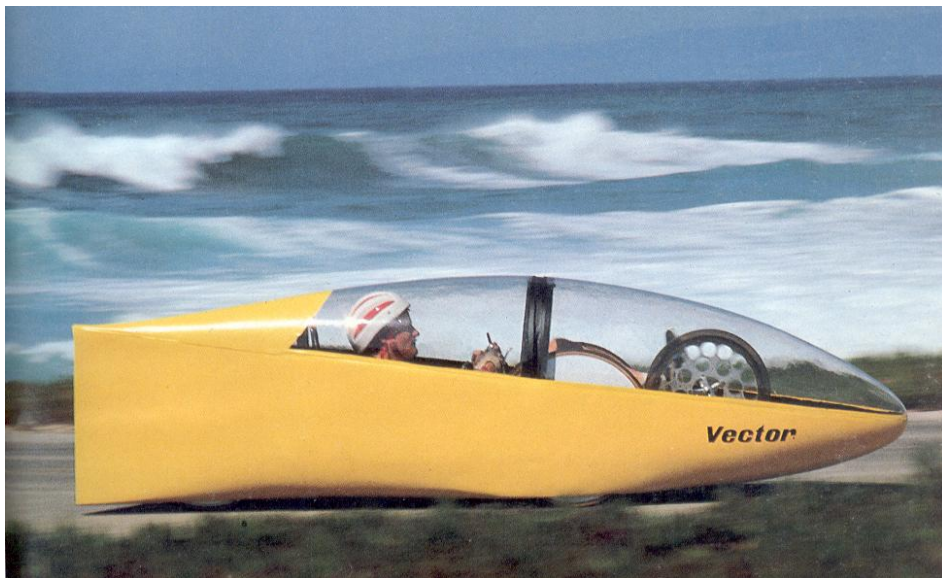
Performance bikes





Trends ...

Experimental bikes





Trends ...

Concept bikes





Trends ...

Experimental (adjustable) bikes





Trends ...

Indian market bikes



## User study

Formal and informal interviews

Image boards and interpretation

Regular interaction with the users

## User study

Most of the teenagers like ACTION movies.

Most of them like RED and BLACK colours.

Teenagers of std.10th and above tend to loose their interest in bicycles. Bicycle using group is from std. 5th to std. 10th .

No one among the teenagers knew about MTB, ATB, BMX features.

Most of them liked Hi-Tech things like SHOCKERS, SUSPENDED SADDLES etc.

Teenagers have a great urge to possess things.

Bikes and Cars are the dream objects for this age group.

Teenagers have a strong urge to become independent.

Most of the teenagers associate them with ANGER and INTELLIGENCE.

Parents are the final decision makers, so there interest should be considered.

Parents use bicycle to tempt teenagers to perform well in academics.

The Relatives and Friends of the parents, the advertisements and cycle repairers play an important role in the opinion making.

## Image boards

IMAGE BOARD 01



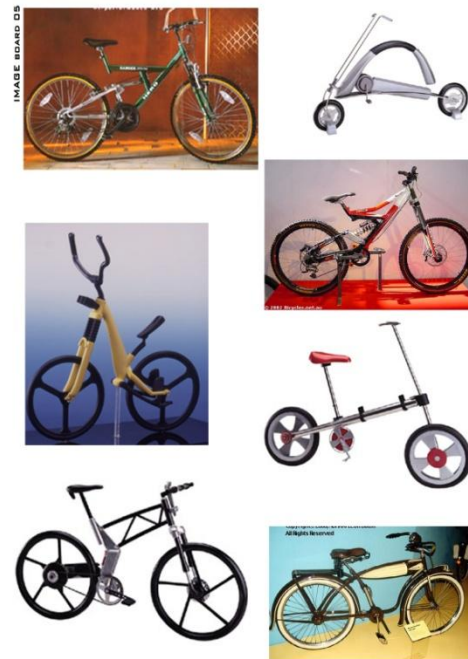
IMAGE BOARD 02



IMAGE BOARD 03



## Image boards



## The Key Observations

1. Many users (children) rode a bike that was actually big for them; they could hardly reach their paddle.
2. The new generation bikes like HERO SWING, AVON OSCAR and other bikes (the one with a diagonal suspension ) was very popular among youngsters as it offers hi-tech features and can be ridden by users of small height.
3. These so-called Y generation bikes like HERO BUZZ, HERO SIREN; AVON ALTON etc. are also appreciated by the parents as they are more or less unisex.
4. Parents and users are becoming health conscious.
5. Parents are ready to spend for the welfare of the child provided they get value of their money.

## Insights

1. Extending usability if used intelligently can be a USP of the product. It can be used to thrill the user and parents at the same time.
2. The product needs to have some element of pleasant surprise, user delight and some uniqueness that may distinguish it from the rest.
3. As the psyche of the people is changing and they are becoming more and more open, it's the right time to introduce the new materials into the Indian market and use it as an USP the product.

## Conclusions

### **Parent's perspective**

Parents main motive is the welfare of the child and value for the money. They want a product that is good for their child and have an extended usability i.e. the product may be used by more then one user occasionally or periodically. Parents will prefer to have a bicycle that is safe, lightweight, long lasting. These are the minimum expectations.

### **Users perspective**

Child's perspective is radically different then that of the parents. From the adolescent's perspective the world has different colours. They go by love at the first sight phenomenon. For them bicycle is a prized possession, its an object to boast about, an object to show off. They often fail to realize the long term and welfare objectives of parents.

The cycle repairer expectations are that the cycle should not be complex for him to operate, yet it should appear complex to user and thus require his aid for maintenance.

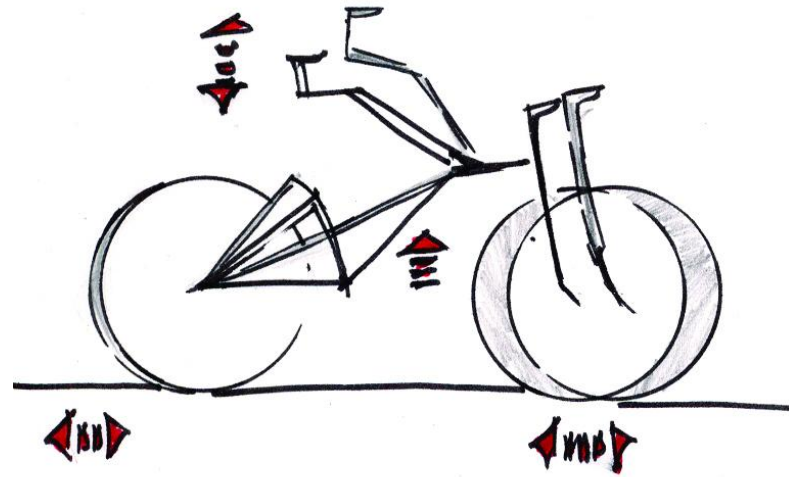
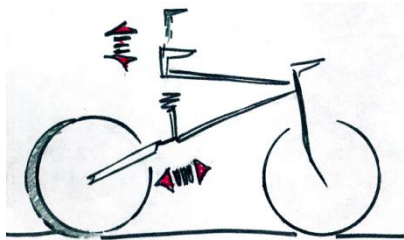
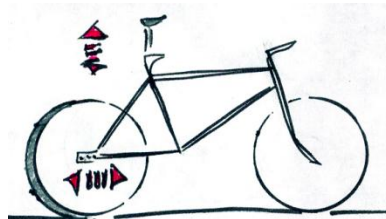
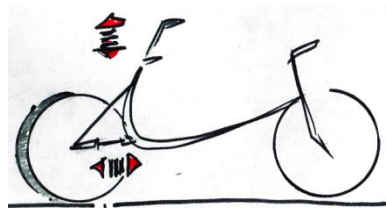
## Approach

**The idea was to create a form that should able serves the physical and psychological expectations of the adolescent as he grows.**

The problem was broke into two parts

1. Mechanism design for the extended usability and value addition.
2. Form incorporating this mechanism that could convey the change as the evolution, respecting the expectations of the direct user, the adolescent.

## Mechanism design

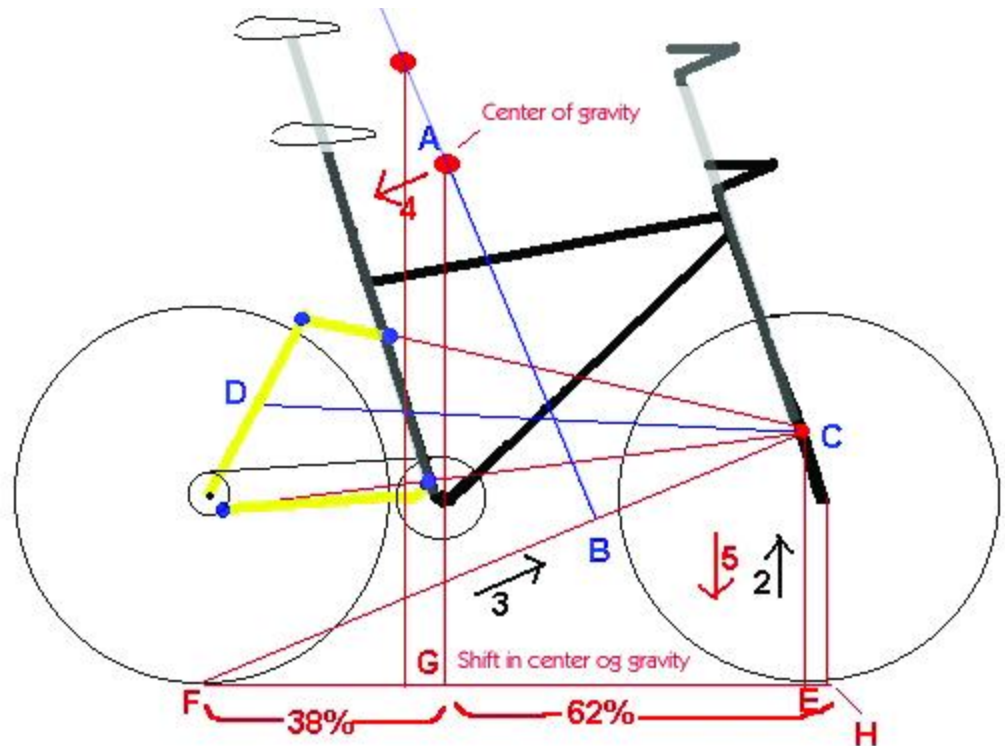


The decision was made on the following parameters.

1. The mechanism should have horizontal as well vertical adjustability. i.e. the wheelbase as well as the height of the bike should adjustable.
2. The mechanism should have an element of pleasant surprise. it should look sophisticated and Hi-Tech.
3. The complete frame should be adjusted with minimum possible adjustments.

## Mechanism design

Why wheel base extension?



Mechanism design

Stages of evolution



Mechanism design

Stages of evolution



Mechanism design

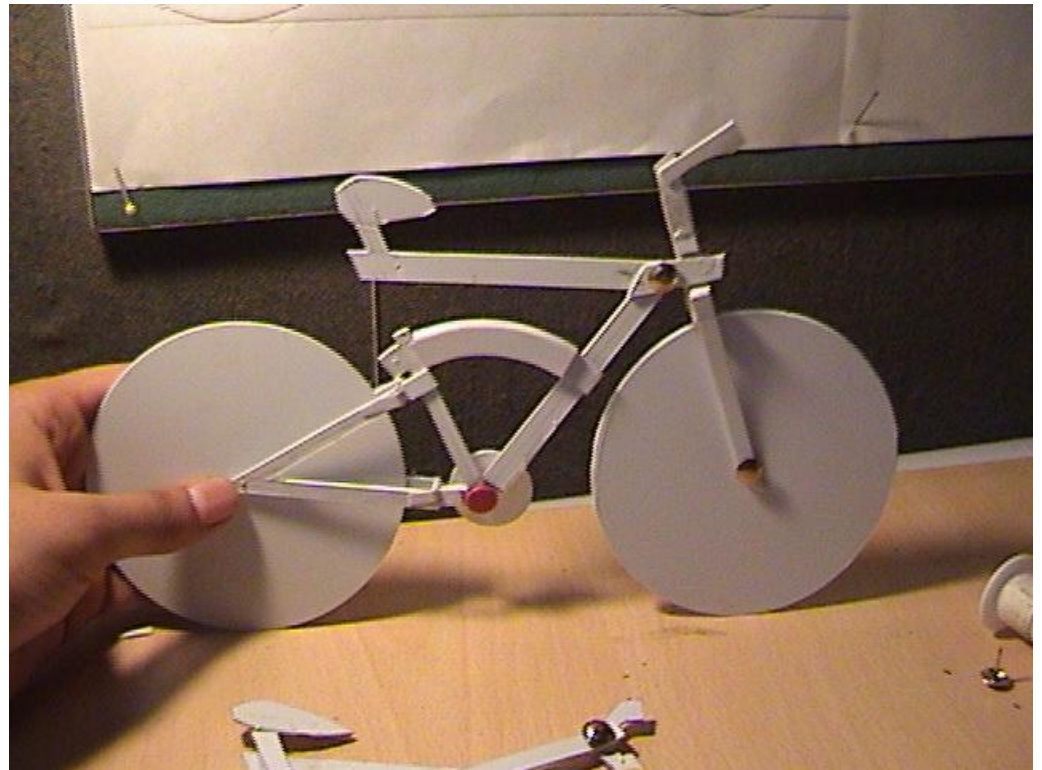
Stages of evolution



## Mechanism design

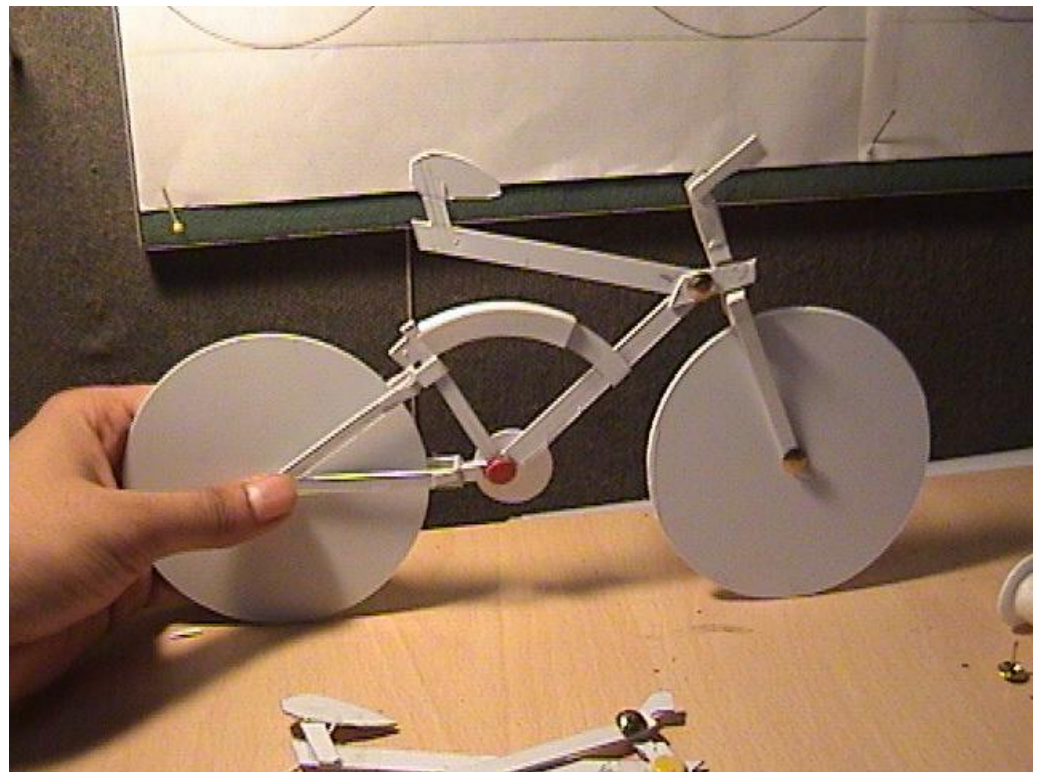
1. The seat height adjusting mechanism (that leads to the wheelbase expansion also ).

2. The maintenance of rake angle



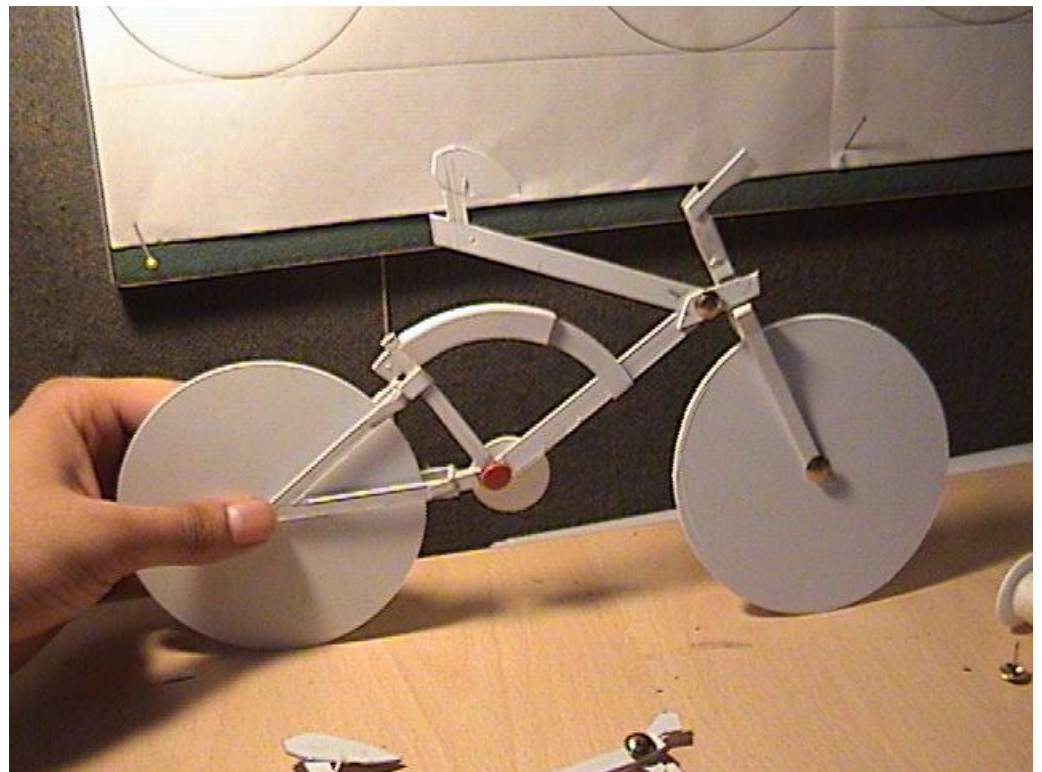
## Mechanism design

### The seat height adjusting mechanism



## Mechanism design

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## Mechanism design

### The seat height adjusting mechanism



Mechanism design

The seat height adjusting mechanism



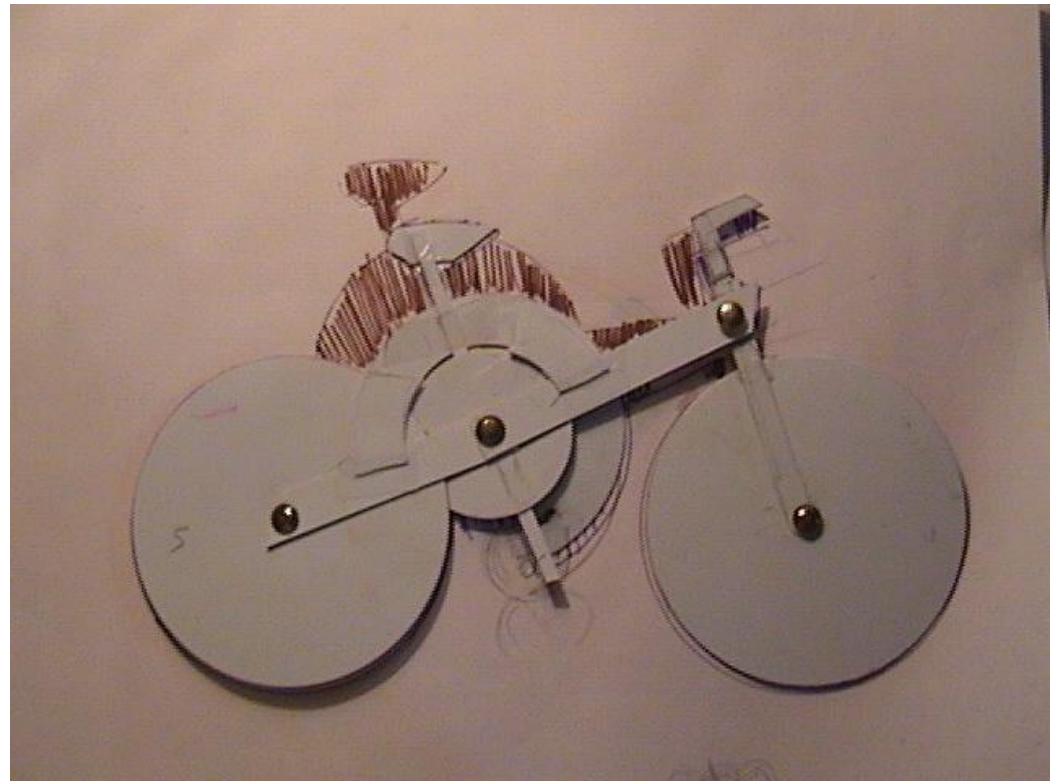
## Mechanism design

### The seat height adjusting mechanism



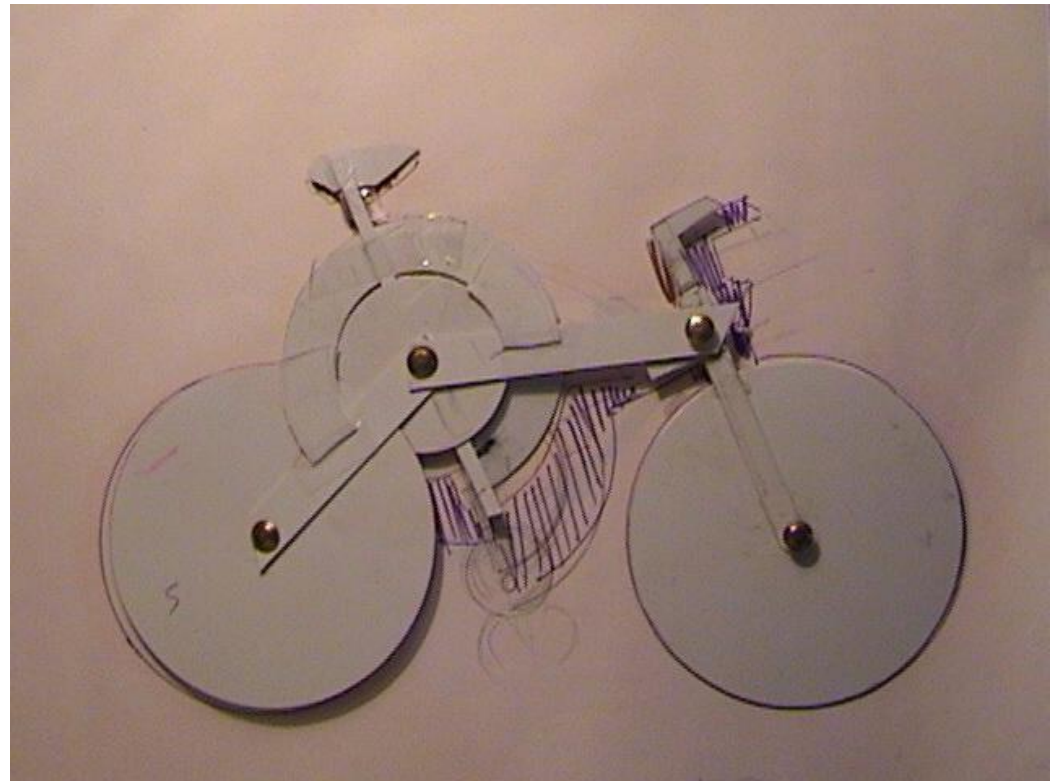
## Mechanism design

The seat height adjusting mechanism



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## Mechanism design

### The seat height adjusting mechanism



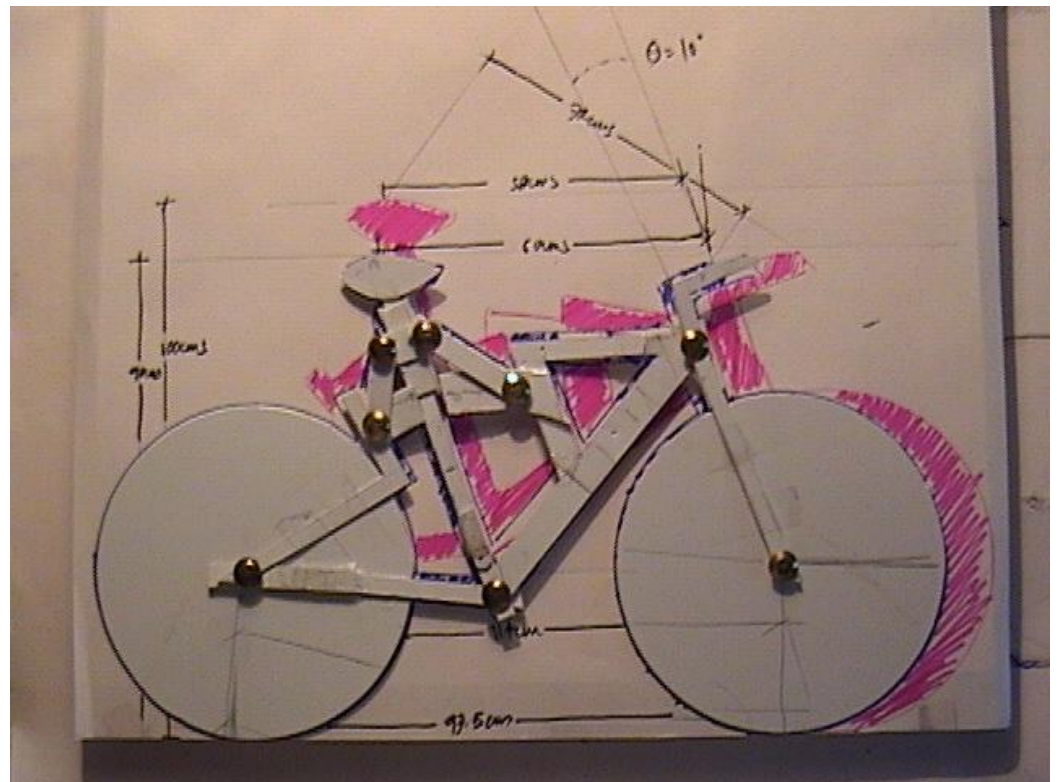
## Mechanism design

### The seat height adjusting mechanism



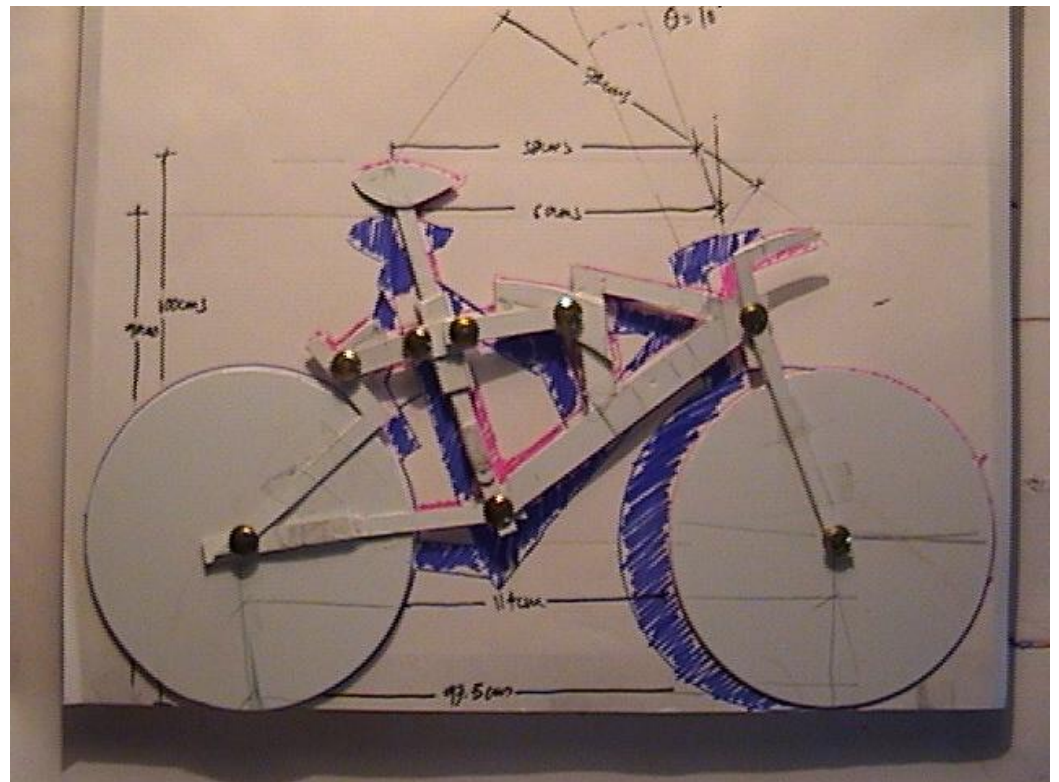
## Mechanism design

### The seat height adjusting mechanism



## Mechanism design

### The seat height adjusting mechanism



## Mechanism design

The maintenance of rake angle

A unique linkage that could relate the two motions i.e. the seat height adjustment and the rake angle adjustment.



## Mechanism design

The maintenance of rake angle



## Mechanism design

The maintenance of rake angle



## Mechanism design

The maintenance of rake angle



## Mechanism design

### Assumptions and facts

The mechanism theoretically has a single movement, to set every thing in place but all the linkages will have to be tightened after the adjustment, to make the structure act like a rigid structure in normal dynamic loading conditions.

The need to adjust the bike has been assumed to be once in six months.

The mechanism offers wheelbase extension of up to 100-125mm and same amount for the height.

The form of the bike shall change every time the adjustment is done as the complete frame unfolds due to the adjustment.

## Form exploration

Fresh, futuristic, sporty, young, vibrant, jazzy, Hi-Tech, anger, intelligence, dynamic, impulsive were some core adjectives.

### **Anger, Intelligence and Hi-tech**

Image boards were made and analyzed to derive the desired formal expression from these.

## Form exploration

Image boards- anger



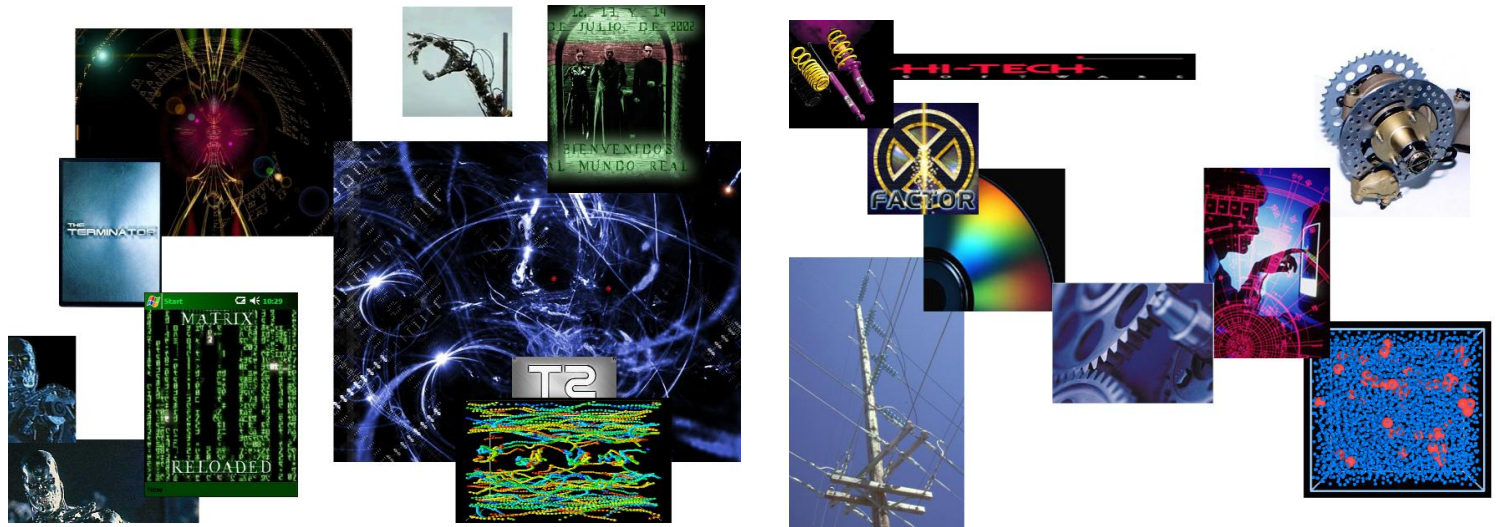
## Form exploration

## Image boards- intelligence



## Form exploration

Image boards- Hi- Tech



Form exploration

Further explorations



## Design concepts

1. Design concepts having a mild or conventional visual vocabulary
2. Design concepts with futuristic and unconventional visual vocabulary
3. Design concepts with in existing image with a futuristic or unconventional visual vocabulary



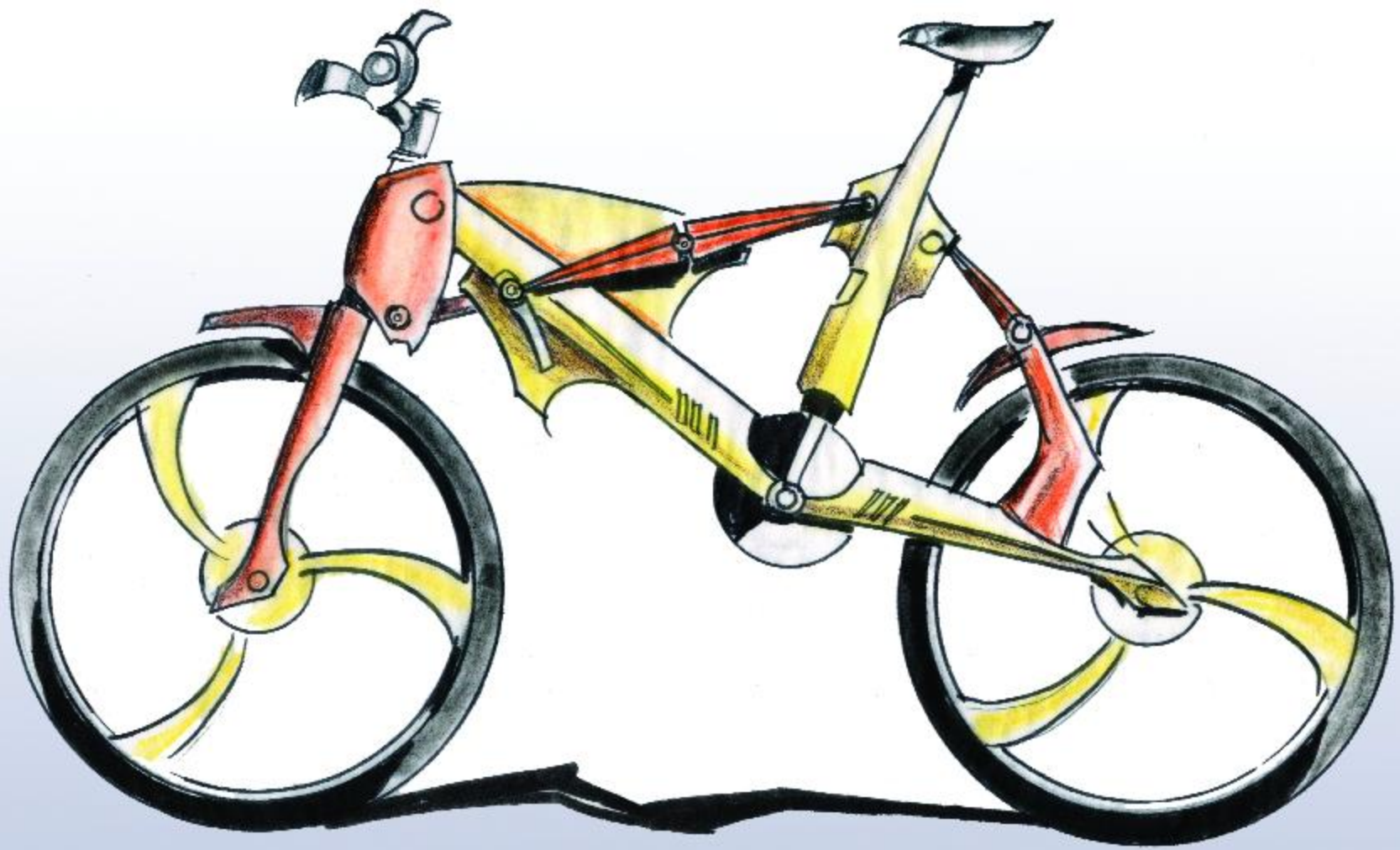
Design concepts having a mild or conventional visual vocabulary



Design concepts having a mild or conventional visual vocabulary



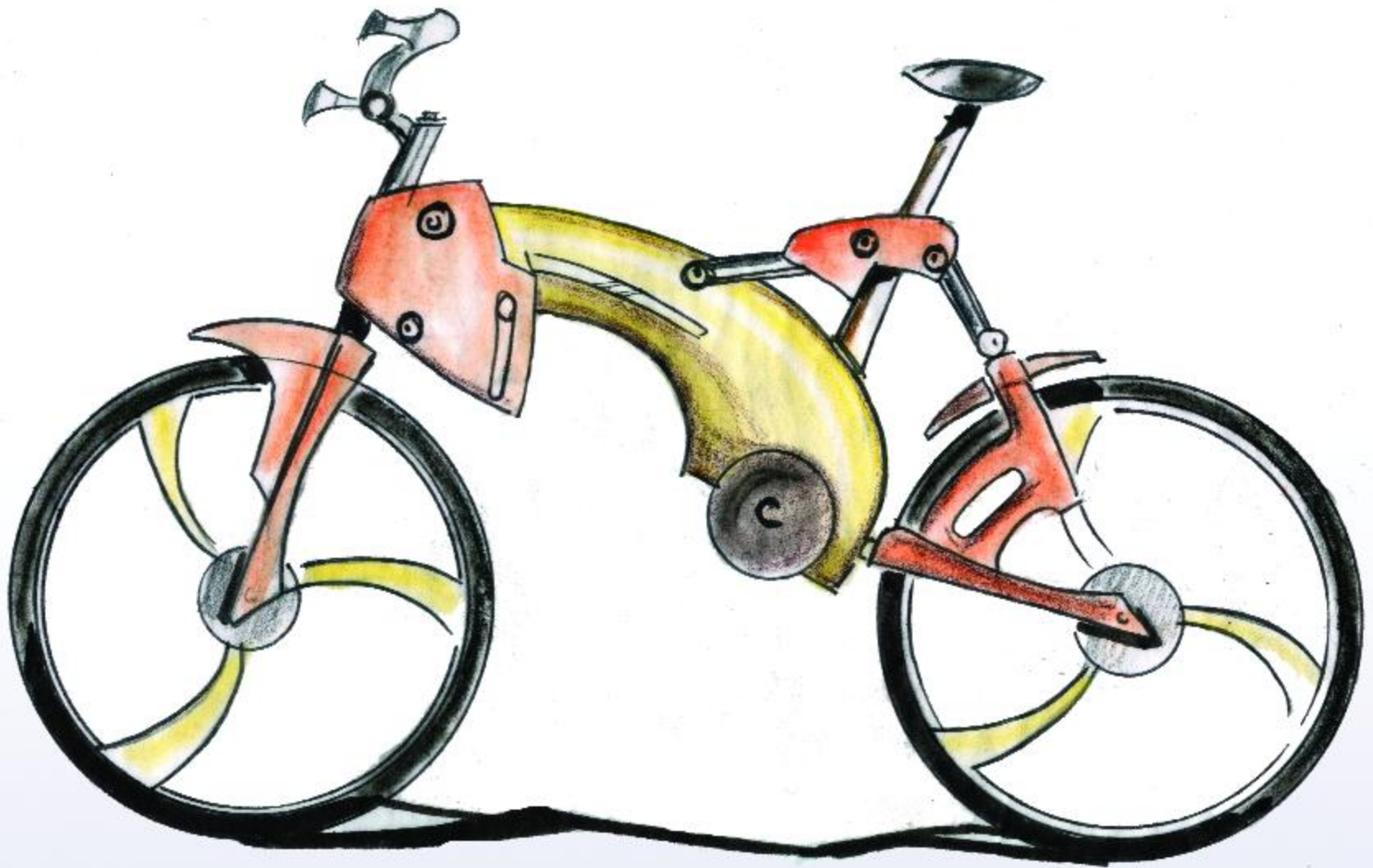
Design concepts with futuristic and unconventional visual vocabulary



Design concepts with futuristic and unconventional visual vocabulary



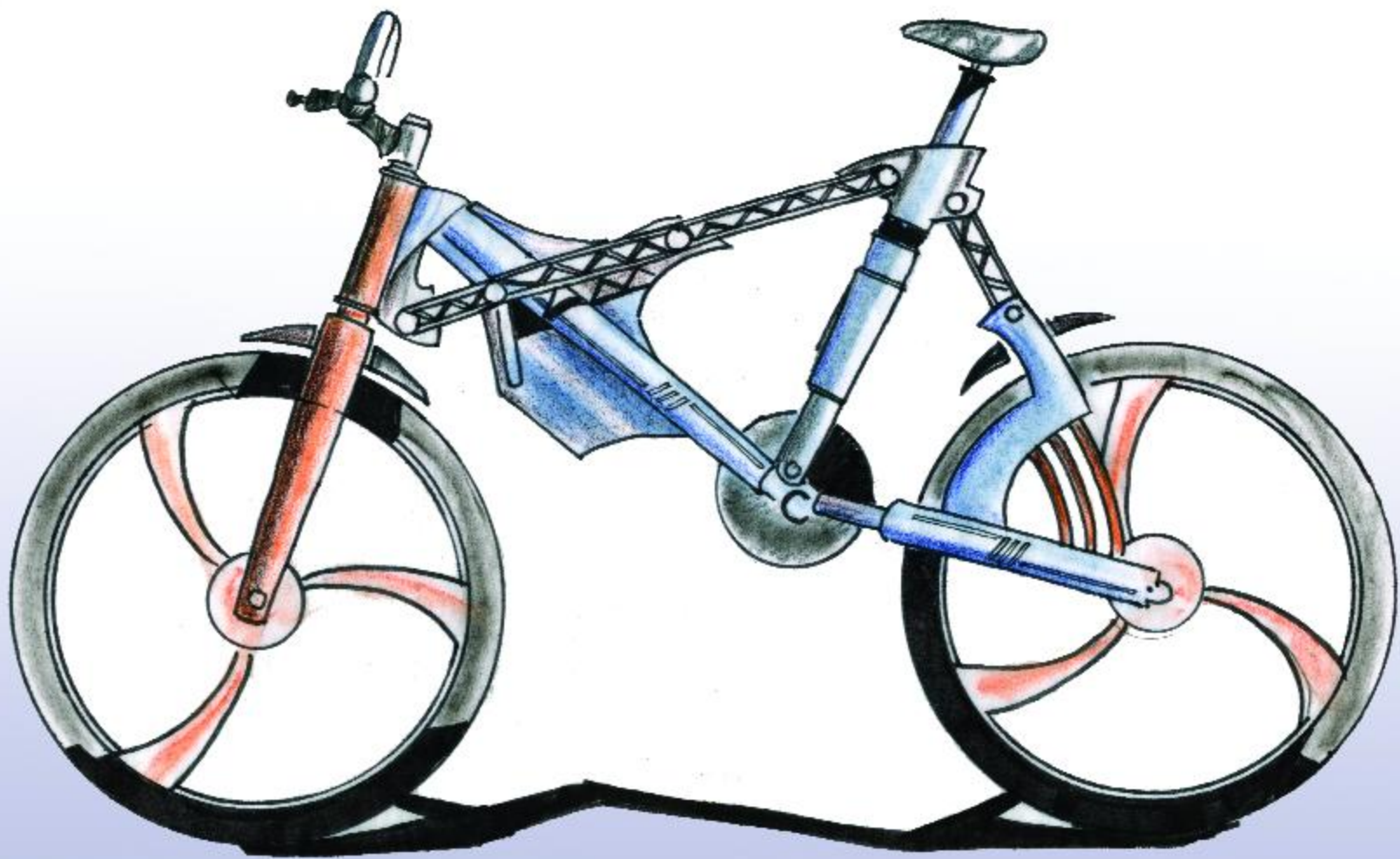
Design concepts with futuristic and unconventional visual vocabulary



Design concepts with futuristic and unconventional visual vocabulary



Design concepts with futuristic and unconventional visual vocabulary

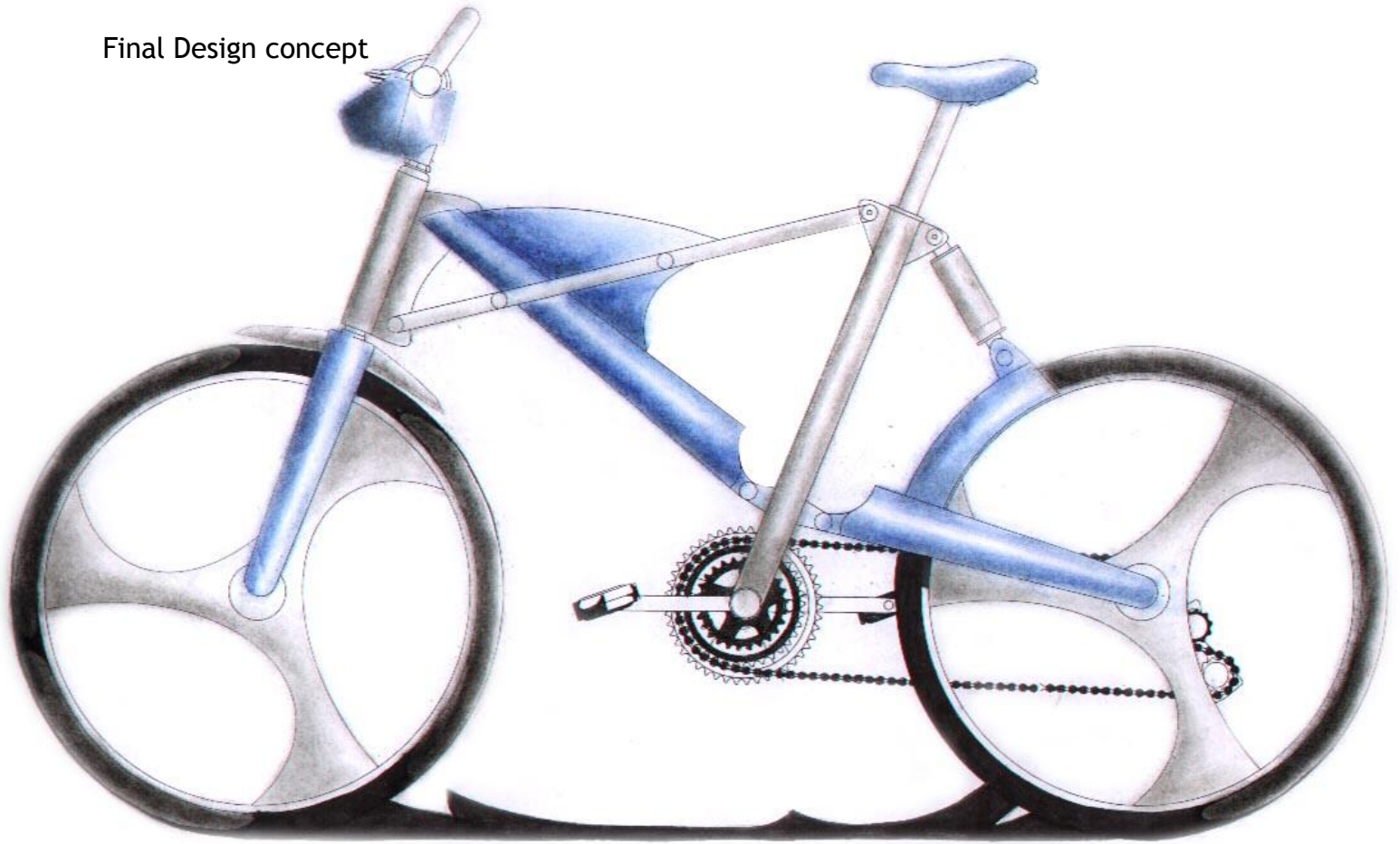


Design concepts with in existing image with a futuristic or unconventional visual vocabulary



Design concepts with in existing image with a futuristic or unconventional visual vocabulary

Final Design concept

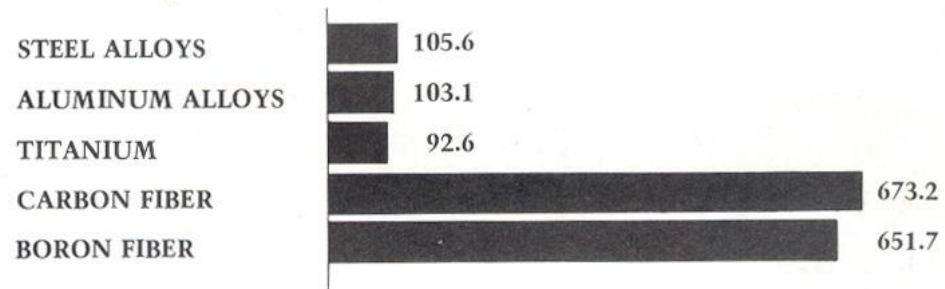


Final Design concept

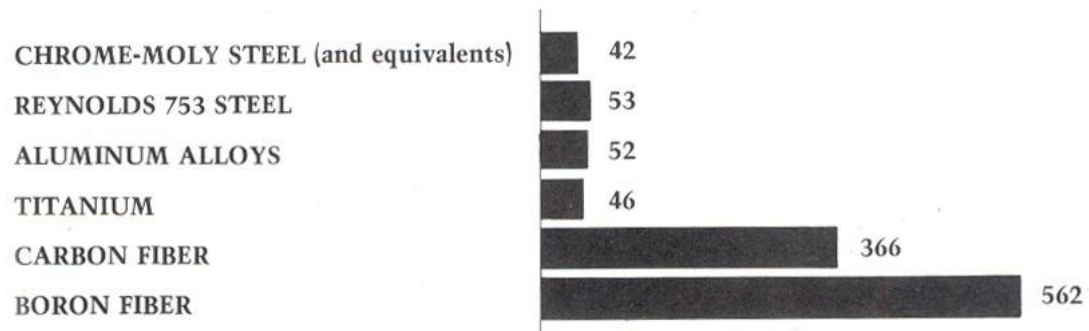


## Materials and manufacturing

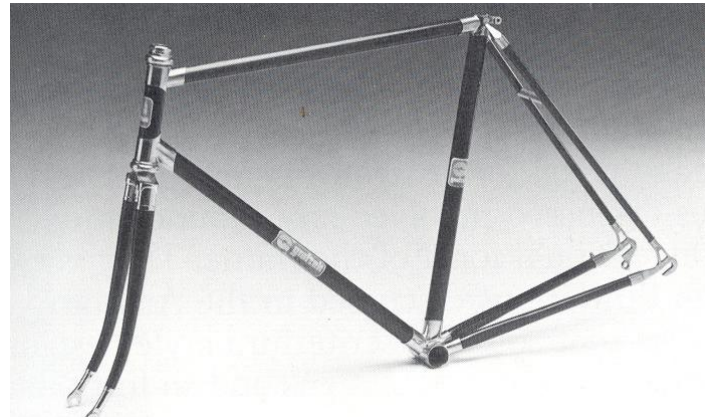
STIFFNESS to WEIGHT (MODULUS  $\div$  by DENSITY)



STRENGTH to WEIGHT (STRENGTH  $\div$  by DENSITY)

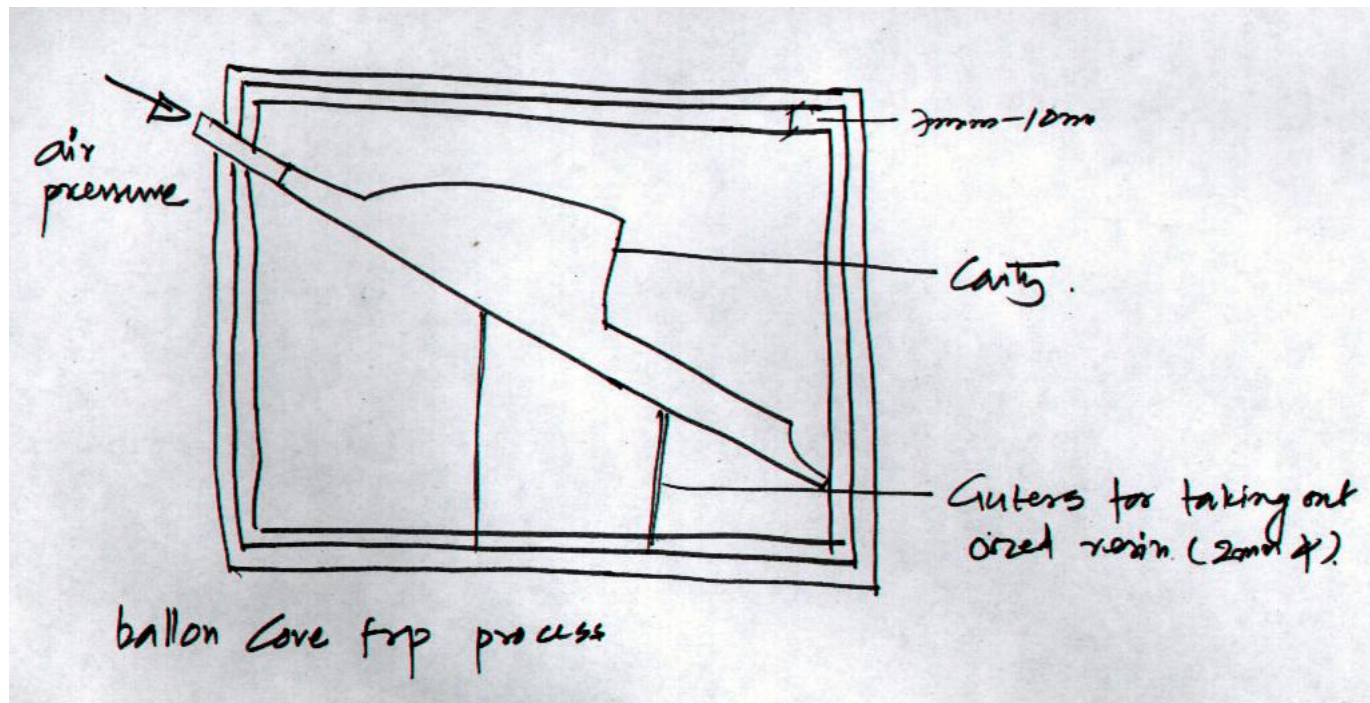


## Materials and manufacturing

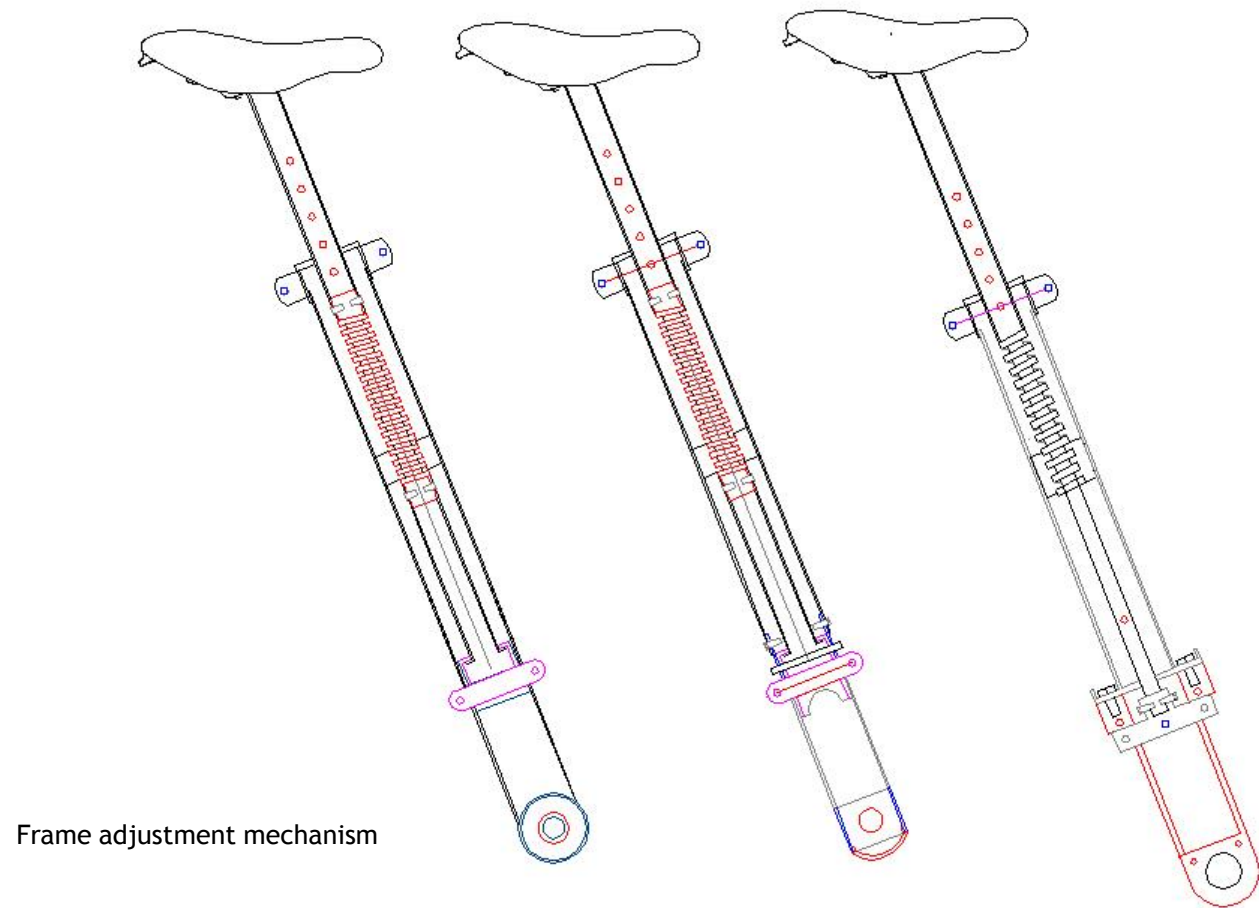


Examples of bike frame with metal joineries

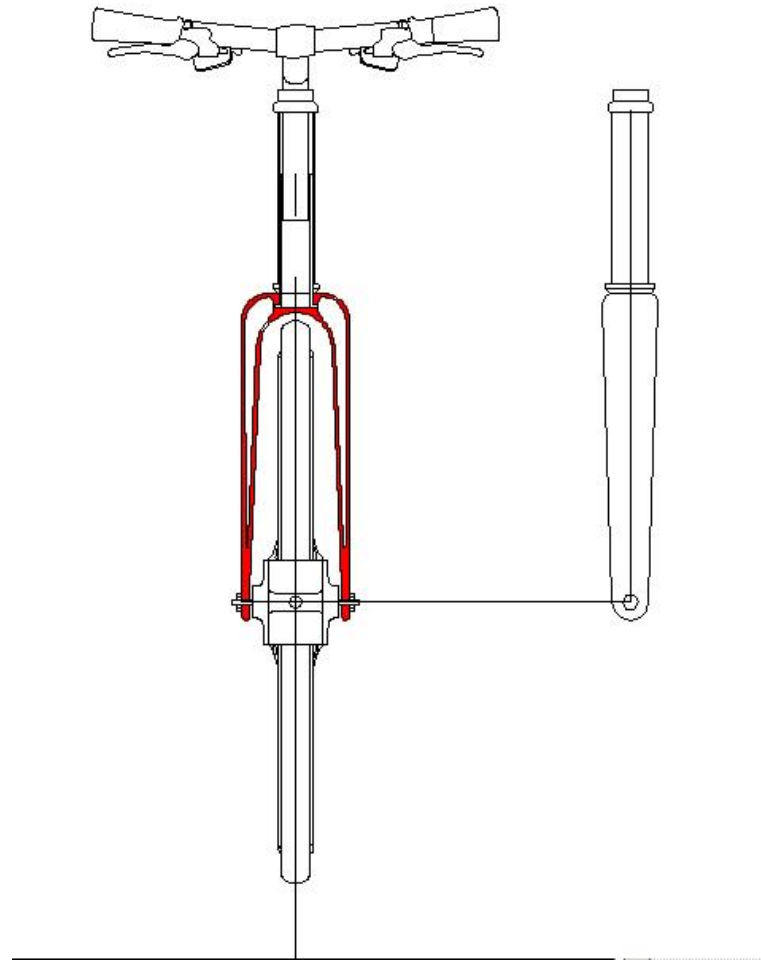
## Materials and manufacturing



## Materials and manufacturing



Materials and manufacturing



Front fork detail

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