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Are children's bicycles really made for children ?

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Last summer on a beautyful Sunday in September we had organized a picnic with a group of friends in the Fontainebleau forest in France. In total five families with children in all ages came with their bikes, ready for a nice trip. The children were really excited to be together with the other children and they started talking proudly about their bikes. It is true that they all had almost new shining bikes, so they had good reasons for being proud. The boys imagined themselves as wood rangers and no hills were too steep to be climbed. The girls talked about the colors , all the accessories on their bikes and developed romantic scenarios for our picnic.

But things should not be as everybody had hoped. Before starting we first had to pump most of the bikes (for some reason this seems to be a job only men can do...). First incidence happened after just a few hundred meters when one of the boys wanted to climb a small hill and the chain fell off and got stuck between the chain wheel and the spokes. Next incidence came when a 7 years girl took the lead and we saw her freewheeling down a long hill with probably more than 60 km/h ! Luckily nothing happened. To our big surprise we found out that the girl was simply not able to stop by using the two hand brakes. The levers were simply too distant from the handlebar and there were so much friction in the system that it required a man's force to pull the brake.

At the next hill most of the children had to get off their bikes. Not only because the hill was too steep, but also because they didn't know how to change the speeds on a 2 x 5 speed mountain bike. Pulling the bikes wasn't much easier. Most of the bikes weighted almost as much as the child itself. It would be the same if a man should push a bike weighing 40 to 50 kg ! The rest of the day continued with loose handlebars, flat tires and a child that locked his bike during the picnic, despite he had left the key at home...

Of course, all the parents agreed that nobody had thought about the children when designing their bikes. Henrik who was in charge of R&D in one of the leading bicycle companies at that time preferred not give any comments.

On our way back we got surprised by the dusk. Nobody had thought about bringing bike lights. Some had a dynamo but in a more or less good state.

Out of proportion !

When you look at a child handling his/her bike you get the impression that biking is hard to learn. Have you ever thought about a normal children's bike actually weights ? Let's take an example. A five years old child is normally recommended a 16" bike. A normal 5 years old child weights 17 kg and a normal bike weights 12 kg. Thus the bike weights 70% of the childs weight. Proportionally, this means that a man weighing 80 kg should ride a bike weighing 55 kg ! Not a wonder children find biking difficult in the early age.

So is there an excuse for this ? When asking people from the industry, the standard answer is that due to the price competition we can only use cheap (more heavy) material such as low grade steel for the frame and cheap rubber for the tires. Furthermore the steel frames are often covered with plastic shields to make the bike look smarter. But isn't there an other way to do it ? We believe the weight issue can become an important sales feature for children's bikes as well. Inspiration for communication to the consumer about it's importance can be found elsewhere on this page. Therefore children's bikes should be designed with this in mind. A more optimized use of material as well as better (lighter) material is one solution. This, combined with a better design which focuses on an optimization of each function. One example is the wheel. On a 16" children's (mountain) bike the width of the tire is typically 1.95". This means that proportionally, considering the height of the child compared to an adult, that the adult should ride with a 26 x 3.2" (!) tire. Here again there should be room for improvement.

Safety – who cares ?

16" is the limit between a toy bike and a children's bike in most countries. Bicycles with a frame size of 16" have to comply with local safety standards, which means that it shall have reflectors, light, brakes etc of a certain quality. When writing this article we visited some shops in France, Denmark and Norway. The result was really astonishing. The size of the brake lever were in the large majority of cases of such a quality that most kids would not be able to pull the lever and keep their hand on the handlebar at the same time ! The quality of the cables gave a fear that rust and lack of oil would make them so hard to pull that no children would be able to use them safely. Who takes the responsibility of the extra risk our kids are exposed to due to a dysfunction of the brakes ? In countries like Denmark the answer to this problem has traditionally been the "reverse" brake which is built into the hub. This again has the risk of getting the feet trapped between the pedal and a stone or root.

When talking to the authorities in different countries we learned that there is virtually no statistics, which explains the difference between the design/quality of the bike and the amount of accidents. But one important thing became clear: The light is still a big and unsolved problem. On children's, junior and adult bikes (>16") light is obligatory in all countries. Either fitted to the bike when it is sold or as an item sold separately, depending on the national legislation. At INRETS, The French National Institute for Transport and Safety Research, it is estimated that between 50 and 75 % of all bikers ride in the dark without light. Probably not because they don't want to be seen, but rather because the light supplied with the bike is either broken, out of battery or has simply disappeared. Looking at the type of light children's bikes are equipped with (when they are equipped...) it is easy to see how much room there is for innovation also in this area. From a design point of view the most robust solution would be an integrated light system, which is created to fit the bike as a part of the saddle and the handlebar. Ideally it should also solve the battery/dynamo dilemma.

Design and appearance

What the bikes shall look like is highly driven by who decides in the shop and the age of the child. At an early age the child has little to say, so simple play-gadgets such as baskets, horns... are important as well as iconic figures as Mickey, Pikachu... Later, at 6-7 years of age the child starts to understand the differences between different types of bikes and highlighting

the basic functions becomes important (suspension, BMX look...). Above this age they want replicas of the adult bikes.

It will be interesting so see if the major European brands also in the future will content themselves with “standard” children’s bikes, bought from Italian and Asian suppliers, or if they will become more involved with the development. Do they have the influence and capacity to develop children’s bikes which better fit the children’s needs ? Will they be able to attract the consumer’s attention to the bike’s important features, or shall children’s bikes also in the future remain a commonplace product which is better bought in a shopping carrier than in a bicycle shop ?

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Pictures

1. The ratio in proportions between a child and his bike were used to design this bike for adults:
    - A 5 year old child weights 17 kg and a grown up man weights 80 kg (ratio 1 : 4.7). If the bike for the child weights 12 kg the up-scaled bike for an adult should weight 55 kg !
    - The child is 110 cm tall and the man is 180 cm tall (ratio 1 : 1.6). If the child has a 16 x 1.95” tire the man should have a 26 x 3.1” tire !

2. Many brake levers are too distant from the handlebar. If the Adult/child size ratio is applied, a brake lever for adults would look like this.

3. A brake lever with a child's hand on a typical children's bike

4. An example of a children's bike made in plastic using a well-known image.

5. A child with a bike weighing 60% of the child's weight