# Business Plan

## Safe Smart Phone Cover.


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## Business Opportunity:

It is common to see smart phones getting damaged. Average broken iPhone is destroyed or damaged just 10 weeks after purchase. Damages have added up to more than $6 billion in repairs and replacements. These statistics are iPhone based. It is assumed that the statistics we have used are similar for any other smart phone.

According to mobileinsurance.co.uk survey, the average length of time people have been putting up with their damaged display is six months. This implies that People are hesitant to get them repaired because of the cost.

This clearly indicates that there is a huge market for a smartphone case that is capable of providing higher safety than the current cases do, at a price lesser than current cases do.

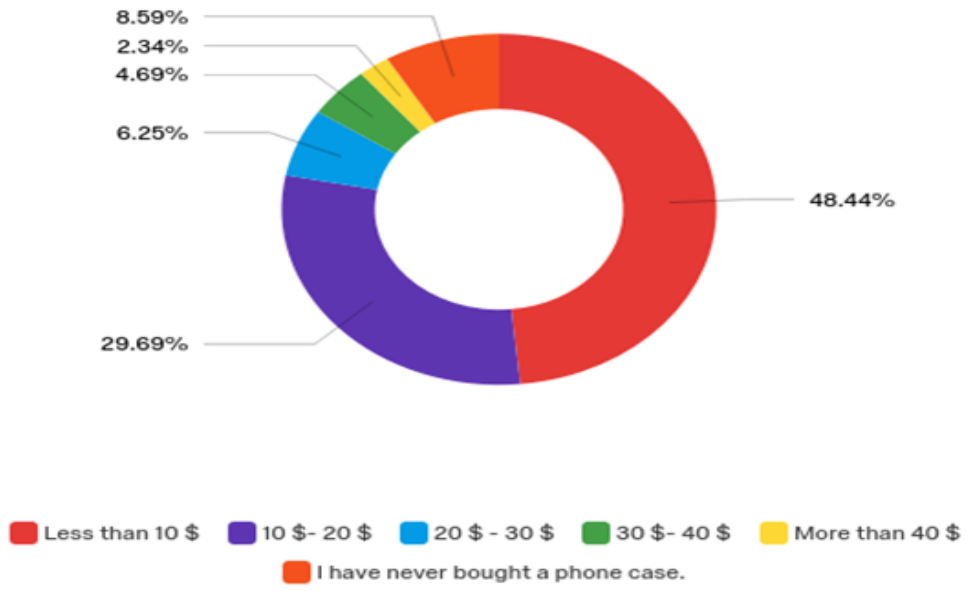
The case should be designed in such a way that, if the phone is dropped, the cover should absorb the kinetic energy of the falling phone by the means of deforming without transferring the impact onto the phone and hence protecting the screen, the body and other internal components of the phone.

Our primary design is to use a spring to absorb the impact force. The first and necessary constraint is the maximum allowable stress on the phone. We can change the stiffness of the spring by changing its diameter. One of the other constraints is the overall size of the spring. This is based on the aesthetics and ease of usage of the case.

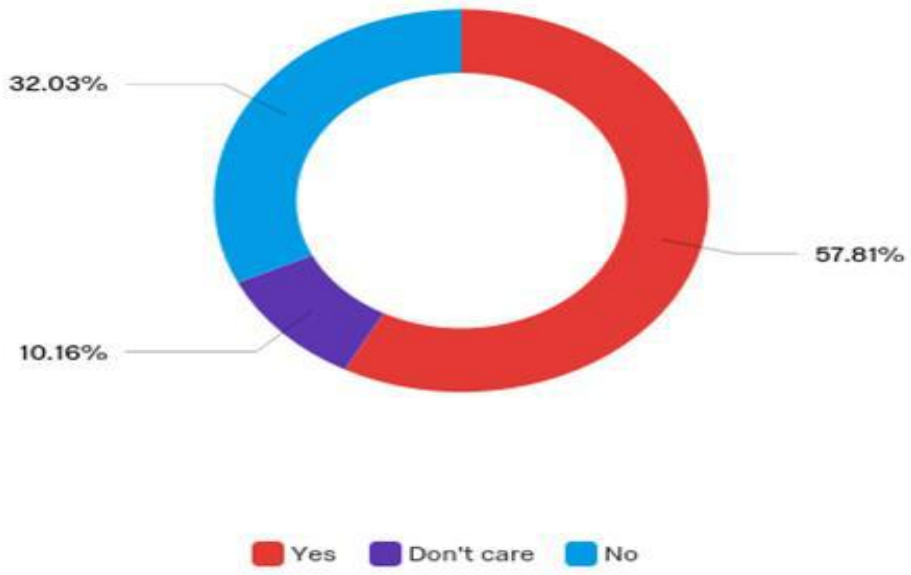
## Market Analysis:

Our Design Attributes were:

1) Case Type (Active/Passive)
2) Cost
3) Safety Rating
4) Weight, Size and Aesthetics

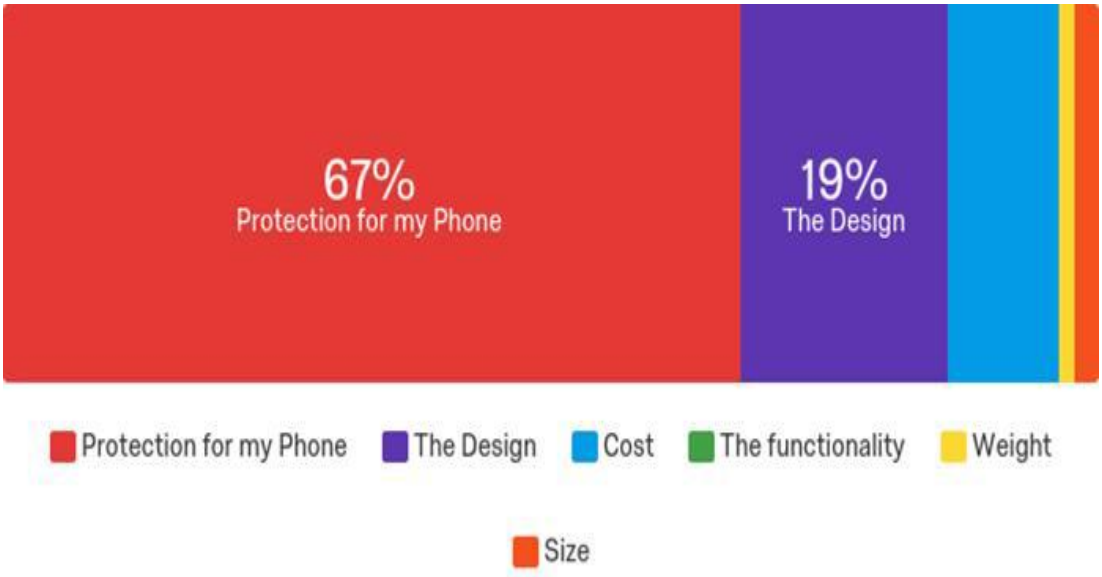



As we can see, people want to spend as less as possible (which is no surprise). But when we see the graph below



we have a different story. Majority of the people aren't confident of the safety that their current case provides.

Are you concerned that your phone case may not be enough to protect your phone?




These were the preferences that we evaluated from the market data we collected.

People would prefer a safe phone and are willing to pay a higher price for it (within a limit of 50 USD) regardless of the method used to provide safety, and weight and aesthetics.

Our company needs an initial investments of 66000$. This money is going to be used to purchase mainly 3D printers to make the body of our phone case, software and other office items. Here we are going to buy 5 3D printers to match the demand of making 11000 phone cases per year. For the setup we are going to rent a place of 1000 sq ft. The regular lease price for industrial work is 12$ per sq ft per year. We are also going to use the significant amount for the pre launch marketing of our case. We are going to hired 2 skilled workers who can operate 3D printers. Other key functions like marketing and selling strategies and product updation are going to be performed by our 5 member team only. There will be other operating cost per year also which includes insurance, electricity and water, internet and phone bills. The material and labour cost of the phone case will be going to come 3$ and we are planning to sell are phone case at 24.99$. This high profit margin is going to

compensate our initial high cost. The detailed explanation and analysis are performed under the title of financial data.

## Financial Data:

To determine total cost we have subdivided cost into three parts.

A) Initial Fixed Cost

B) Fixed Operating Cost (per year)

C) Manufacturing cost (per unit)

- **Initial Fixed Cost includes**- a) Development cost (engineering, industrial design and marketing) & b) Initial Manufacturing cost (equipments, transportation, set-up)

| **Items** | **Cost (in $)** |
|---|---|

a) Development Cost

| | |
|---|---|
| Engineering | 5000 |

| | |
|---|---|
| Industrial Design | 5000 |
| Initial marketing | 15000 |
| | |
| Total | 25000 |

b) Initial Manufacturing Cost

| | |
|---|---|
| Equipments (3D Printers) | 4*5000=20000 |
| Transportation | 10000 |
| IT set up | 6000 |
| Office setup | 5000 |
| | |
| Total | 41000 |

So, for starting this business we need the initial investment of 66000$ (25000+41000).

B) Fixed Operating Cost (per year) includes- a) Administrative Cost (salary, rent, utilities, insurance) and other operating cost (maintenance, sales, and marketing).

| **Items** | **Cost (in $)** |
|---|---|

a) Administrative Cost

| | |
|---|---|
| Employee salary ( 2 employee) | 46080( 12 per hour * 160 hr per month * 12 months * 2 employee) |
| Rent | 12000 ( 1000 * 12 ) |
| Electricity and water | 1200 |
| Internet and Phone | 1200 |
| Stationeries | 1200 |
| Insurance | 8000 |
| | |
| Total | 69680 |

b) Other Operating Cost

| | |
|---|---|
| Maintenance | 4100 |
| Sales | 5000 |
| Marketing | 16000 |
| Product Updates | 1000 |
| | |
| Total | 26100 |

So, throughout the year to run the business smoothly we need the operating cost of 95780$ (69680+26100).

C) Manufacturing cost (per unit) includes material cost and labor cost. For our case we are going to use plastic for case and spring steel. Total manufacturing cost per unit will be 3$ (2 for material cost[1,2] and 1 for labor cost)

Three-year summary of Pro-forma income and cost projections:

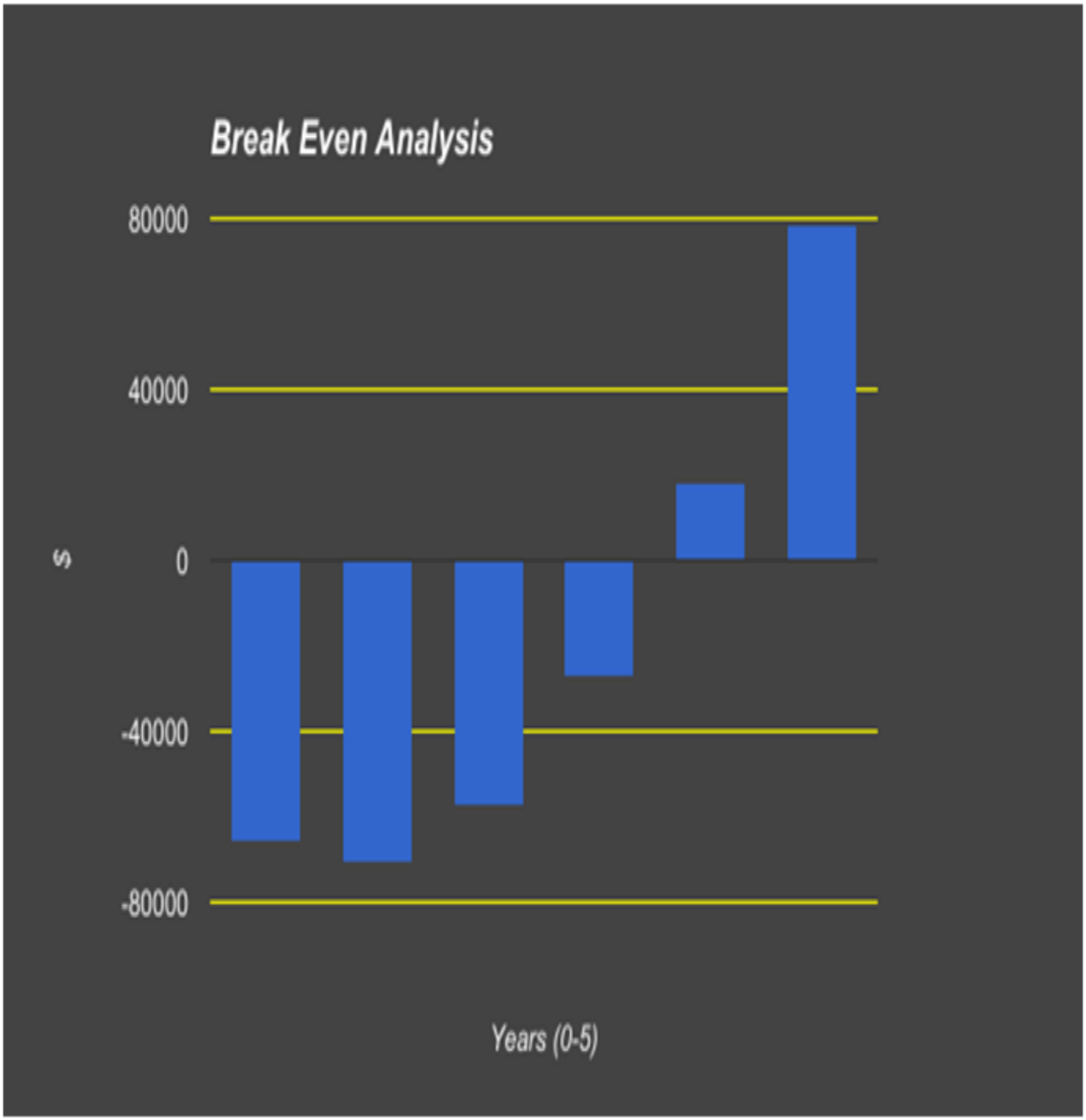
| | |
|---|---|
| Price | 24.99 $ |
| Cost per unit | 3 $ |
| Starting sales | 11000 |
| Sales growth rate | 10% |
| Tax rate[3,4] | 18% |
| Discount rate | 6% |

| **Project year** | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Income : -** | | | | | | |
| Investor contribution | 80000 | | | | | |
| Total sales | 0 | 11000 | 12100 | 13310 | 14641 | 16105.1 |
| Sales revenue | 0 | 274890 | 302379 | 332616.9 | 365878.59 | 402466.449 |
| | | | | | | |
| **Expense : -** | | | | | | |
| Initial cost | 66000 | | | | | |
| Cost of product | 0 | 33000 | 36300 | 39930 | 43923 | 48315.3 |
| Fixed operating cost | 0 | 247000 | 247000 | 247000 | 247000 | 247000 |
| | | | | | | |
| **Net profit : -** | 14000 | -5110 | 19079 | 45686.9 | 74955.59 | 107151.149 |
| Post-tax profit | 14000 | -4190.2 | 15644.78 | 37463.258 | 61463.5838 | 87863.94218 |
| | | | | | | |
| Running cash balance | 14000 | 9809.8 | 25454.58 | 62917.838 | 124381.4218 | 212245.364 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Present value conversion** | 14000 | 9254.528302 | 22654.48558 | 52827.03003 | 98521.73603 | 158602.0829 |
| **Breakeven : -** | -66000 | -70745.4717 | -57345.51442 | -27172.96997 | 18521.73603 | 78602.08289 |

- Phone case is a 81 billion $ industry. Expecting 0.000215% of the business and average industry growth rate of 10 %, we will get break even at 4th year.
- Here we have taken 18% of Tax rate and considered 6 % of discount rate.
- As shown in above table though initial investment is bit high we are going to have break even at 4th year if everything works according to plan and assumptions. And after the break even we will have significant profit because of the higher profit margin per case.

**Break Even Analysis:**



## 3. Supporting documents

### 3.1 Existing patents

Following are the existing patents available in phone cases:

Cell Phone Protection Case Structure

Patent number: US 20130264235 A1

Abstract:

A cell phone protection case structure includes a soft inner casing, a hard outer casing coupled to the soft inner casing, a soft inner cover, and a hard outer cover coupled to the soft inner cover. The soft inner casing has a pair of side walls and engaging portions at two sides thereof. The hard outer casing also has a pair of side walls at two sides thereof to engage with the side walls of the soft inner casing and to wrap a cell phone. Through the elasticity of the soft inner casing and the soft inner cover, the present invention has elasticity to protect the cell phone. Through the hard outer casing and the hard outer cover, the present invention has a durable effect. Besides, the outer surfaces of the hard outer casing and the hard outer cover can be colored, patterned or decorated.

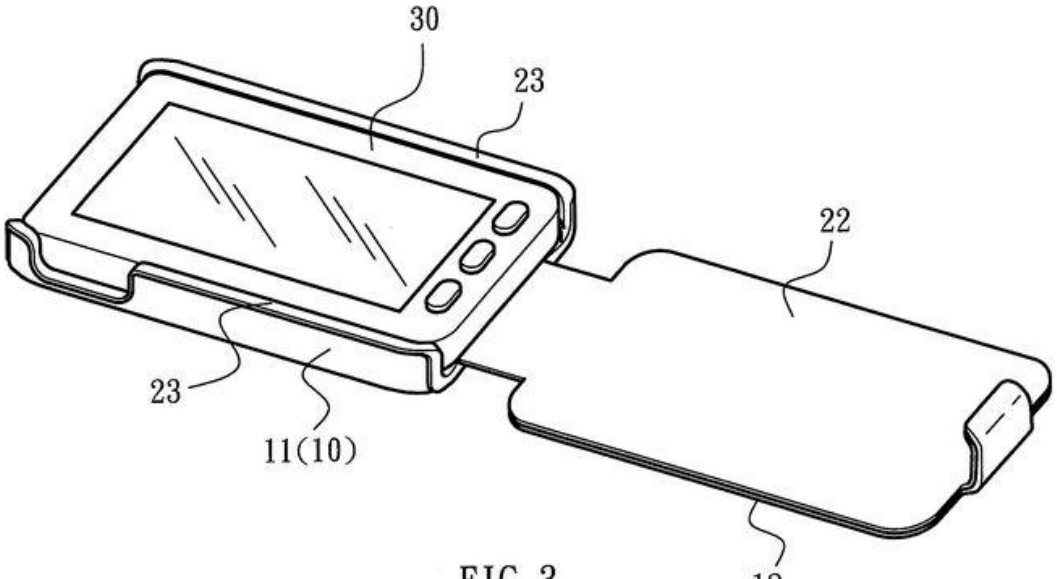
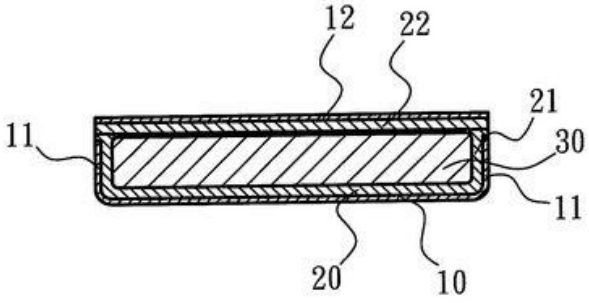



FIG. 3




How is our product different?

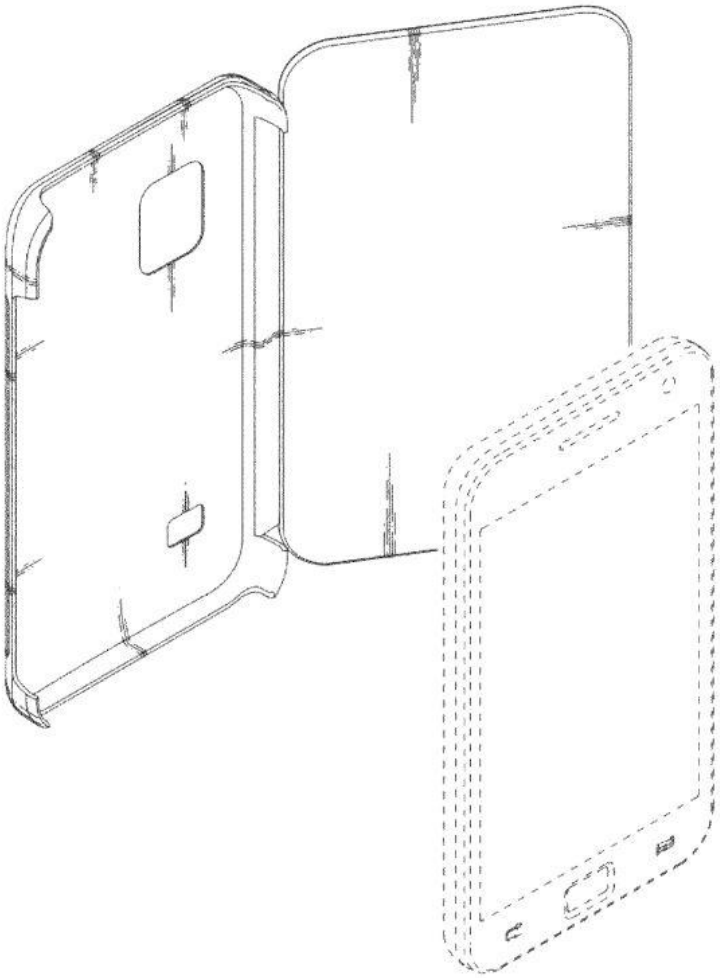
- ➔ Our product has springs that are connected to cell phone case to absorb the kinetic energy of a falling phone case. Then, there is a hard phone cover to protect it further and thus, providing dual protection.
- ➔ The product in this patent has hard exterior cover and soft interior to absorb.

Mobile Phone Case

Patent number: US D746275 S1

Abstract:

This is the famous samsung flip cover that was world renowned. The mobile phone wallet design is a leather flip case cover croco style for Samsung I9100 Galaxy S2 as shown below:



How is our product different?

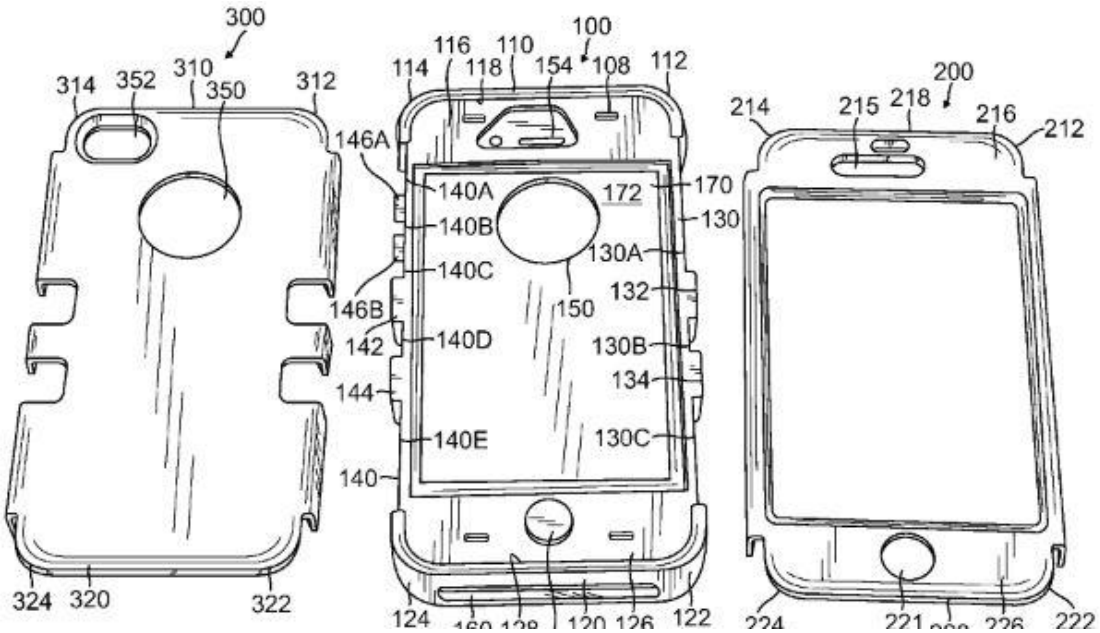
- ➔ This product has a leather flip cover to protect screen from scratches and dust. This flip cover is more of ornamental feature for a phone case but does not necessarily protect from fall.

Cell phone protector case having the combination of an interior soft silicone shell and a hard exterior shell with aligned retaining members

Patent number: US8439191B1

Abstract:

A cell phone protector case comprising a combination of an interior soft silicone shell and a first and second hard shell press fit retained on opposite surfaces and sides of the interior soft silicone shell with the hard shell having matching retaining closing member mating flanges.



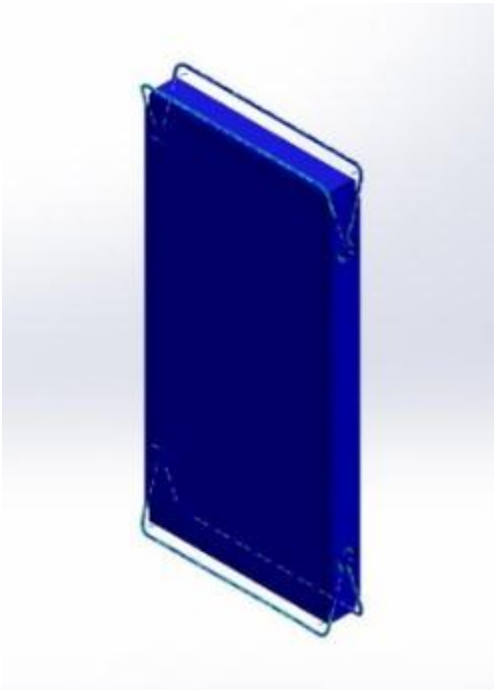

How our product is different?

- ➔ This product has a hard exterior shell on both sides and a soft interior to absorb energy unlike our product which has exterior spring to absorb the falling energy and hard exterior case as second protection.\

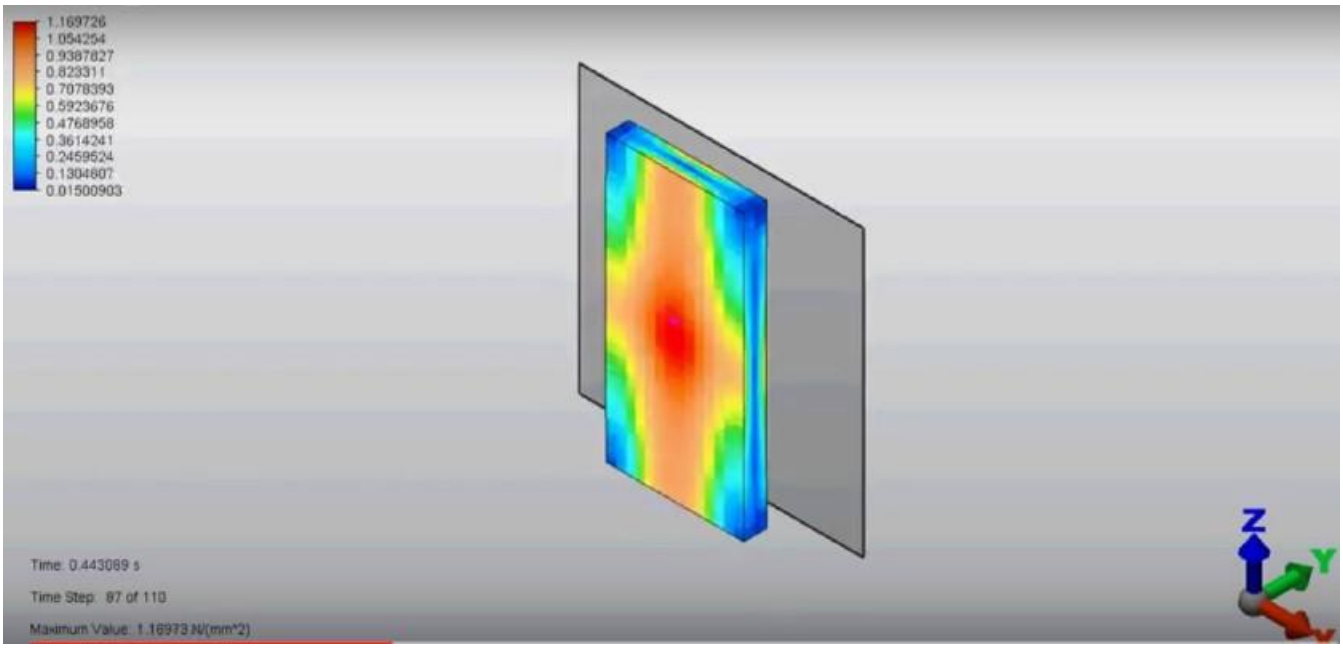
## 3.2 Technical analysis and benchmarking

**Technical Analysis:**
The case is designed in such a way that, if the phone is dropped, the cover will absorb the kinetic energy of the falling phone by the means of deforming without transferring the impact onto the phone and hence protecting the screen, the body and other internal components of the phone.
We are using springs to absorb the impact force. The first and necessary constraint is the maximum allowable deformation of the spring. We can change the stiffness by changing the diameter of the spring. One of the other constraints is the overall size of the spring. This is based on the aesthetics of the case.

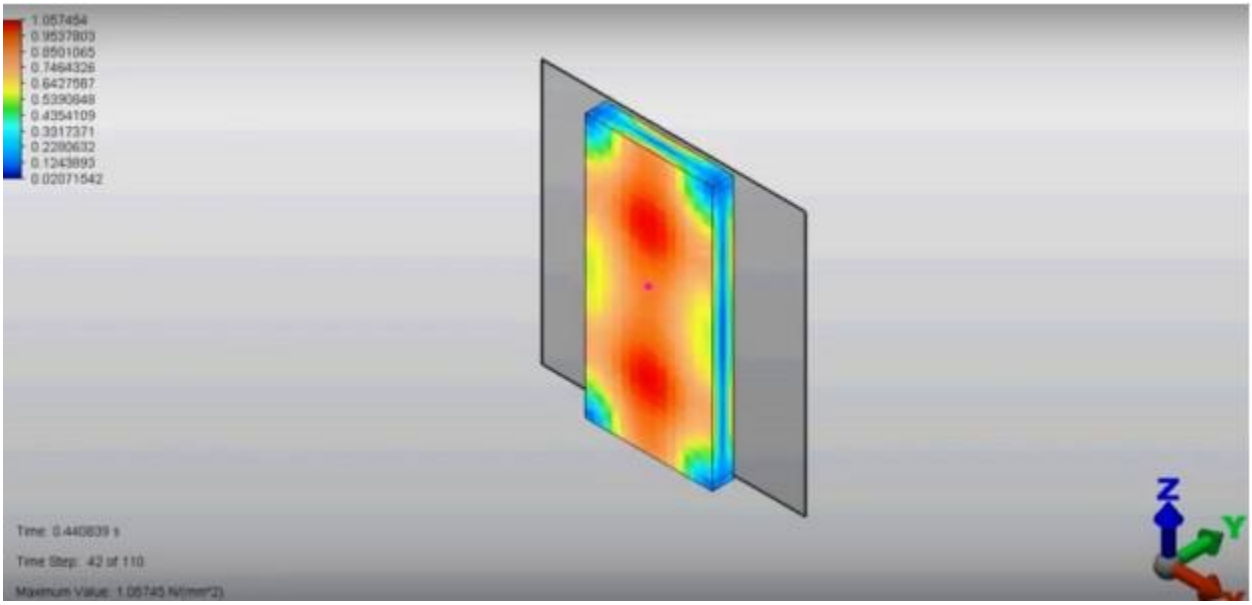
**Our design will be an assembly of the case with groves, and two torsional springs that go into the groves.**



**Additional Analysis** was done, as the logic behind the previous ansys simulations was flawed. Here, we have analysed the von mises stress on the phone itself, as it goes through the sequence of falling and hitting the ground. We made simulations for a spring diameter of 1mm (that we selected in the previous analysis), and it worked well for us.

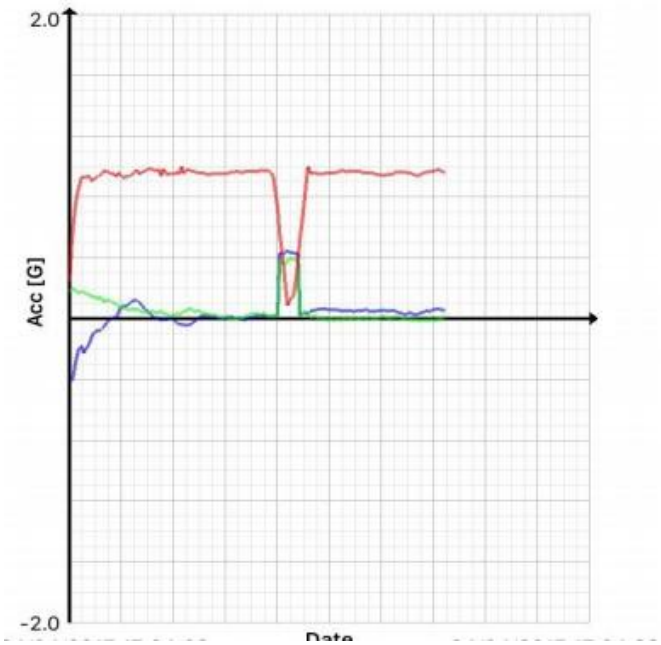


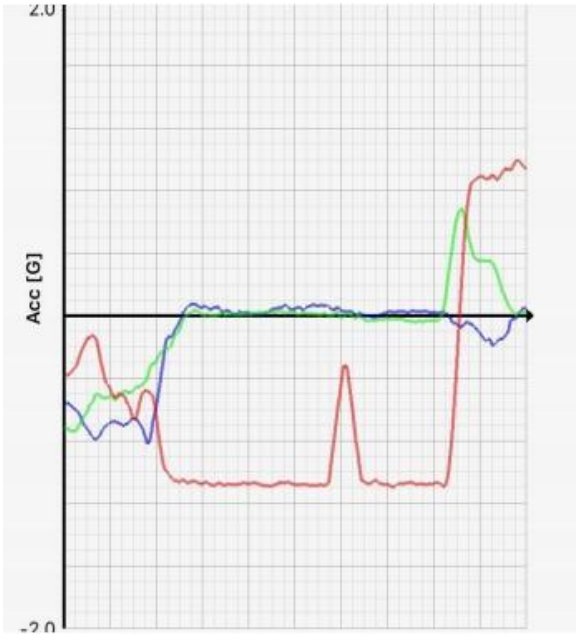

The above figure shows the phone without the case being dropped from a height of three feet. As you can see, the maximum stress in the phone is 1.169 N/mm^2. When we compare this to the phone with the case below, which is dropped from a height of six feet, with the case, the stress is quite comparable.




As we can see from the figure, the maximum stress here is **1.057 N/mm^2.**

These results are reinforced with the results that we got earlier with the accelerometer data




Acceleration vs Time the spring from a height of 3 feet (.)

Acceleration vs Time With Spring from a height of 6 feet

As we can see, the acceleration spikes in the two cases are very similar. The reason why the two accelerations graphs are in the opposite direction is because while conducting the experiment, we used the case facing up, for the spring version, and we used the case facing down (so that we don't have to make another case, without the springs for the experiment). But the important take from these graphs is the magnitude of accelerations, which is very similar.

Reference


1) https://www.alibaba.com/showroom/abs-plastic-in-bulk%252fabs-plastic-pellets-price.html
2) https://www.alibaba.com/product-detail/custom-made-metal-spring_1168749642.html?spm=a2700.7724838.0.0.5KiPoZ
3) https://taxfoundation.org/2017-state-business-tax-climate-index/
4) http://www.nolo.com/legal-encyclopedia/arizona-state-business-income-tax.html
5) https://www.google.com/patents/US20130264235
6) https://patents.google.com/patent/USD657354S1/en?q=mobile+phone&q=case
7) https://patentimages.storage.googleapis.com/pdfs/a3641f2b403a40b733bc/US8439191.pdf
8) http://www.statisticbrain.com/iphone-smartphone-accessories-market-share/
9) https://www.abiresearch.com/press/mobile-accessories-revenues-total-815-billion-2015