

This excerpt is from a project addressing an issue that exists with stabilizing ladders commonly used in residential settings.

Element F: Consideration of design viability

This entry would be likely to receive a **score of 4**, based on the EDPPSR. The proposed design was reviewed and compared, using a solution matrix, to other existing designs based on several important and appropriate extra-functional considerations including cost, storage capability, ease of attachment, versatility, simplicity, and ready availability of materials. The judgment about viability of the new design based on those considerations is generally realistic and supported with clear and credible evidence.

Both peer group and external input were sought as part of this review process. Missing from the entry, however, was any indication of the peer evaluator identification/selection process or specific detail as to instructions and resources with which those peers were provided. While this is not a requirement, demonstrating that these reviewers were typical of anticipated end-users would have strengthened the consideration of design viability.

Engineering Design Process Portfolio Scoring Rubric Component and Element Titles

Component I: Presenting and Justifying a Problem and Solution Requirements

- Element A: Presentation and justification of the problem
- Element B: Documentation and analysis of prior solution attempts
- Element C: Presentation and justification of solution design requirements

Component II: Generating and Defending an Original Solution

- Element D: Design concept generation, analysis, and selection
- Element E: Application of STEM principles and practices
- **Element F: Consideration of design viability**

Component III: Constructing and Testing a Prototype

- *Element G: Construction of a testable prototype*
- Element H: Prototype testing and data collection plan
- Element I: Testing, data collection and analysis

Component IV: Evaluation, Reflection, and Recommendations

- Element J: Documentation of external evaluation
- *Element K: Reflection on the design project*
- Element L: Presentation of designer's recommendations

Component V: Documenting and Presenting the Project

- Element M: Presentation of the project portfolio
- Element N: Writing like an Engineer

Please Note: Elements M and N require no submission from the portfolio author(s) and are intended to be scored based on the portfolio work as a whole from what has been submitted from Elements A through L

Element F: Consideration of design viability

5 The proposed design was carefully reviewed based on several relevant extra-functional considerations; a judgment about design viability based on those considerations—the capacity of the proposed solution to address the problem—is clearly realistic and well supported with credible evidence.

4 The proposed design was adequately reviewed based on several relevant extra-functional considerations; a judgment about design viability based on those considerations—the capacity of the proposed solution to address the problem—is generally realistic and adequately supported with credible evidence.

3 The proposed design was partially reviewed based on one or two relevant extra-functional considerations; a judgment about design viability based on those considerations—the capacity of the proposed solution to address the problem—is only somewhat/sometimes realistic and is only partially supported with credible evidence.

2 The proposed design was superficially reviewed based on one or two relevant extra-functional considerations; a judgment about design viability based on those considerations—the capacity of the proposed solution to address the problem—may be generally although not completely unrealistic and/or may be inadequately supported with credible evidence.

1 The proposed design was superficially reviewed based on one or two extra-functional considerations of marginal relevance; a judgment about design viability based on those considerations—the capacity of the proposed solution to address the problem—may be unrealistic and/or not supported with any credible evidence.

0 There is no evidence provided that the proposed design was reviewed based on any extra-functional considerations.



A

B

C

D

E

F

G

H

I

J

K

L

M

N

Ladder Stabilizer

CONSIDERATION OF DESIGN VIABILITY F

Evidence of Design Feasibility

Our team researched fifteen articles to justify our problem statement. “Over 150,000 Americans receive medical treatment each year for injuries from falling off ladders. Most incidents occur at home while doing routine jobs.” These articles supported four different attack paths that included health and safety, technical, economic and education attack paths.

We consulted J.D. Brown, Professor of Safety Engineering at Oklahoma State University about the feasibility of our three proposed projects. He stated that adaptability of the gecko feet would make that his preferred choice. He stated that several homeowner’s tools ending up hanging in garages.

The team performed a current and past solutions search which included patents and found the following:



QualCraft Industries. (n.d.). Qualcraft 2475 basemate easy connect professional ladder stabilizer. Retrieved from <http://www.qualcraft.com/>

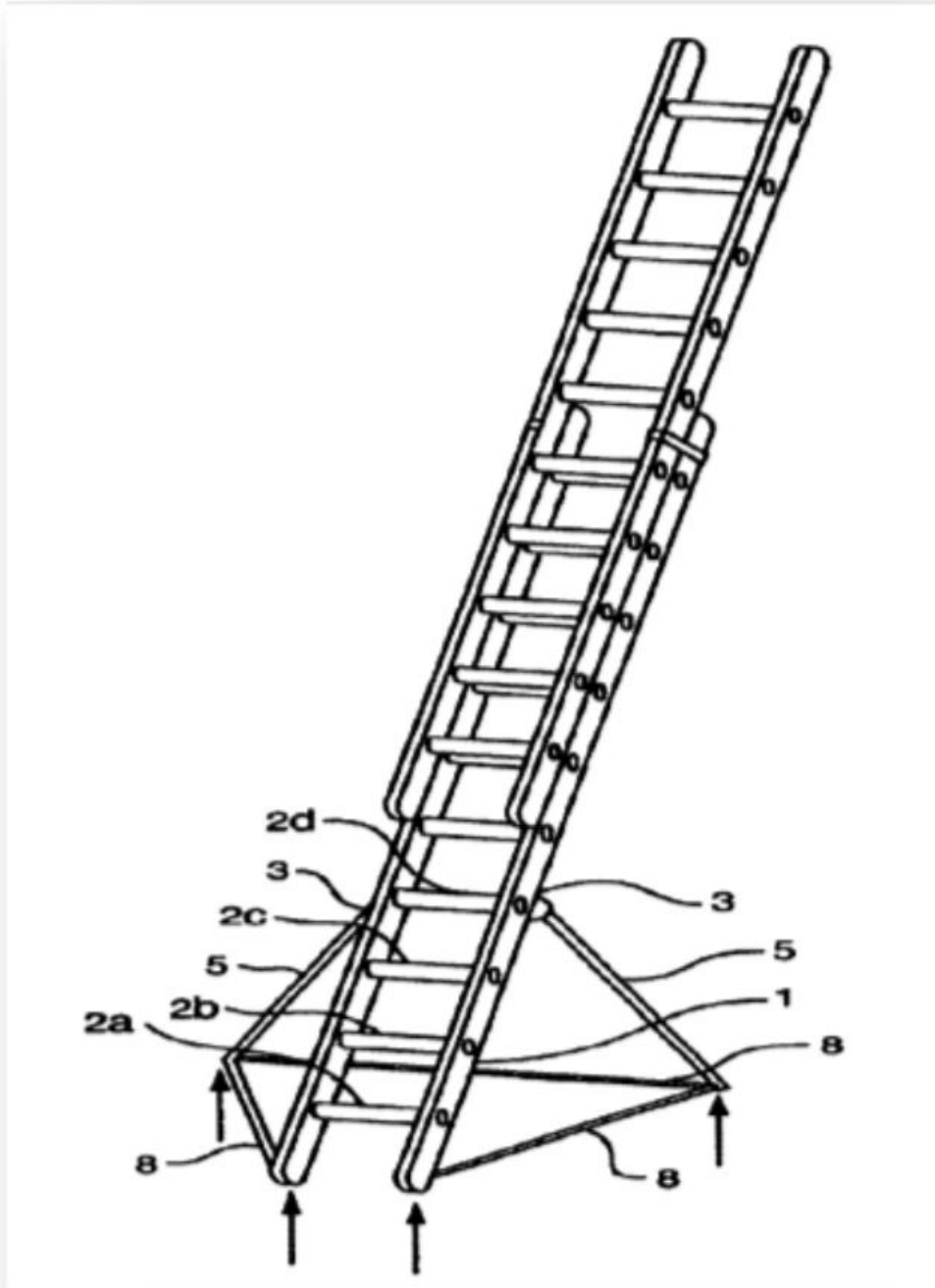


Rojak Design Ltd. (n.d.). *Stopper base ladder stabiliser*. Retrieved from <http://www.rojak.co.uk/products/stopper.html>





BBF TRADING LIMITED. (n.d.). http://www.bbfladdersplatforms.co.uk/youngman/the_ladder_m8rix_professional_.html. Retrieved from http://www.bbfladdersplatforms.co.uk/youngman/The_Ladder_M8rix_Professional_.html

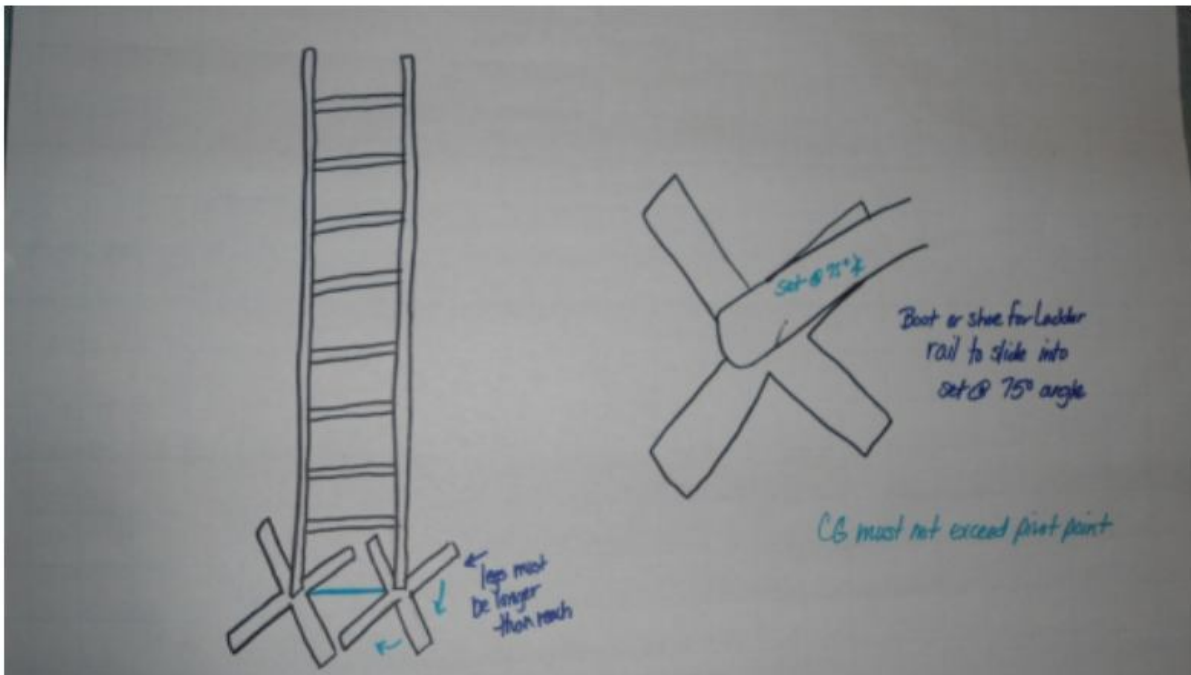


Ladder Stabilizing Device - A device for stabilizing a ladder including a first stabilizing member having a predetermined fixed first length, a second stabilizing member having a predetermined fixed second length, a support structure for being mounted to the ladder at a predetermined location, the support structure being mounted to an upper portion of the first and the second stabilizing member, respectively, the support structure for holding the upper portion of the first and the second stabilizing member in proximity of a first frame rail and a second frame rail of the ladder, respectively, such that the first and the second

	10	10	9	9	11	9	10	12	11	12	10	11					124
Base B																	97
Frame C																	101

As you can see the Gecko solution ranked higher than both the existing solutions and the other two proposed solutions. This was based on several factors such as cost, sturdiness, and material availability.

Peer group evaluation also picked the gecko feet as the most preferred choice of the three possible solutions.



The possible solution is based on the principle of Gecko feet. The idea is to provide stability to the ladder by broadening the base on which the ladder rests in a simplistic manner.

We constructed our prototype from readily available items like a PVC downspout adaptor and metal L brackets from our local home improvement store. When manufactured the foot could be produced from spring steel or something that would be more substantial.