# applied human aesthetic in artificial limb design research design development study

masters industrial design

development study

massey university college of creative arts

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# "form follows function - that has been misunderstood".

"form and function should be one, joined in a spiritual union."

Frank Lloyd Wright.

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# declaration

This thesis titled Applied Human Aesthetic in Artificial Limb Design is presented in partial fulfilment for the degree Master in Industrial Design.

Daniel Buxton. 2005.

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# abstract

fig.1


This abstract provides the reader with a brief overview of this Industrial Design Development study.

The term Industrial Design is one that will not be readily recognised within the prosthetic industry around the world. One branch of Industrial Design is the application of 'humanistic factors' to product research, development and design. The visual aesthetic form of current artificial limb design appears to deliver an inconsistent communion with the functional criteria. This engineer dominated industry is motivated by product function while seemingly lacking consideration for factors like human/machine interface, comfort factors and natural structural form.
The physiological expectations and user requirements of an amputee progressively dictate the functional advancements in research and development, and thus artificial limb research and development is at the forefront in robotic industries, material development and to a varied extent man machine interface systems.

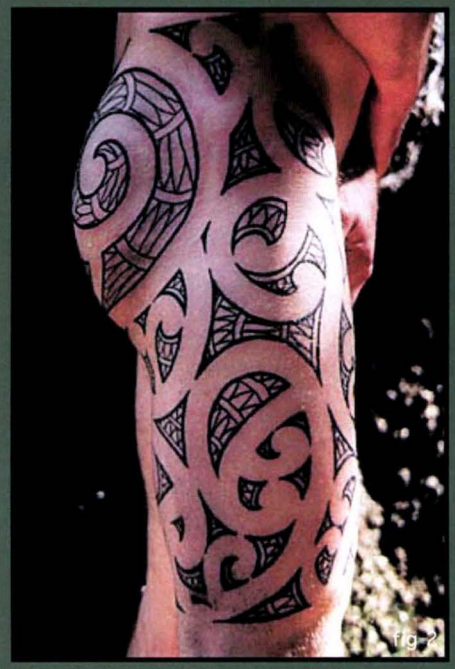
'We've got to this international place in the world and I think that if we are going to do anything in New Zealand in the way of design, we have to first become jolly good designers.'

Coe, J. (1972). (Interview). Nees,G. Five characters in search of a style. Designscape,33:2.

'Why don't we make artificial limbs that are not stumps or broomsticks?'

Coe, J. (1972). (Interview). Nees,G. Five characters in search of a style. Designscape,33:2.

In today's commercial environment there appears to be a growing demand for lower extremity prosthetic extensions that replicate the function of of the limbs being replaced. The artificial limb is a complex piece of equipment. Modern research and development processes are orientated towards an engineered functional outcome. Do current research and development processes place less consideration on the missing humanistic form than the function?



What we are now seeing in research and development is micro-processor technology being integrated into the limb to control preset dynamic movements. This technology has greatly contributed to the mobility of thousands of amputees who otherwise would have been wheelchair bound.

What is missing?

The answer is the humanistic touch. We are now witnessing an overload of technological advances without any real consideration of the human aesthetic. Form has taken a back seat to the functional attribute. While functional values are of great importance, form should by no means be neglected.

'Possibly we should produce international artificial limbs and Maori artificial limbs?'

Athield, I. (1972). (Interview). Nees,G. Five characters in search of a style. Designscape.33:2.

The process of artificial limb attachment (suspension) requires the prosthesis to be attached to the existing 'residual limb'. The favoured and most accessible avenue for a transtibial (below knee) amputee is to use either a Urethane sleeve or a Vacuum Socket. These methods though successful, do not provide the residual limb with a habitable environment.

Herein lies the dilemma. While an amputee is able to re-establish certain lost movements, both the humanistic and physical/physiological barriers remain. Aesthetic form is relegated to a distant second place. For some the absence of the aesthetic may be as devastating as the inability to function normally.

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