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**MASSEY UNIVERSITY**

**Review of Armed Offenders Squad and Special Tactics Group  
fitness policy for the New Zealand Police**

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Science  
in  
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**ABSTRACT****Phase One: Web based survey questionnaire.**

Recruitment into the New Zealand Police's Armed Offenders Squad [AOS] and Special Tactics Group [STG] depends on successful completion of selection courses, as detailed in their respective physical fitness policies. Importantly, these physical assessments must be justified as being relevant and representative of the necessities of job duties. Therefore, as part of a review of the physical fitness policies of the AOS and STG of the New Zealand Police, Phase One of this research sought to objectively determine similarities and relationships between the AOS and STG, and the relevance of physical selection tasks utilised. A web-based survey questionnaire was developed to: 1) provide a demographic profile of the AOS and STG; 2) identify why candidates chose to participate in selection; 3) identify potential barriers for gaining entrance into the AOS and STG; 4) identify physical preparation methods for selection tests; 5) identify troublesome tests; and 6) establish the validity between fitness assessments and the perceived relevance of job demands. A total of 179 AOS ( $N = 298$ ) and 35 ( $N = 38$ ) STG members volunteered to participate in the on-line survey document. The main findings revealed that the 12 minute bridge test had the lowest perceived relevance of all selection tests, while the rope pull-up had moderate perceived relevance but was coupled with a high failure rate. This provided evidence to further research the aforementioned assessments in Phase Two of this project.

**Phase Two: Analysis of the rope pull-up and twelve minute rotational bridge.**

The rope pull-up and 12 minute bridge test are physical assessments utilised to identify whether STG members possess appropriate levels of physical fitness required to perform their role. Due to a lack of empirical research, and Phase One findings, this study sought to: 1) determine whether the rope pull-up is a suitable assessment tool to assess operational climbing ability; and 2) determine whether the 12 minute rotational bridge test is a safe and suitable assessment of core endurance. Nineteen STG members (mean  $\pm$  SD; 40  $\pm$  5 y, 184  $\pm$  5 cm, 93.6  $\pm$  7.4 kg, 25.4  $\pm$  1.9 kg·m<sup>2</sup>) volunteered to participate in this research. Surface electromyography was utilised to measure peak muscle activity of the brachioradialis, biceps brachii, mid-deltoid, upper pectoralis major, mid-trapezius, lower trapezius, latissimus dorsi and infraspinatus during rope pull-up, ladder climb and rope climb tasks. Average muscle activity and signal frequency of the rectus abdominis, external oblique, internal oblique, multifidus, lumbar erector spinae, thoracic erector spinae, latissimus dorsi and mid-deltoid were measured during the 12 minute bridge test. Results revealed significantly higher activation of the pectoralis major during the ladder climb when compared to the rope pull-up (81.2 vs. 47.1 %MVIC), and of the pectoralis major (102.6 vs. 47.1 %MVIC) and infraspinatus (81.9 vs. 57.4 %MVIC) during the rope climb, when compared to the rope pull-up (all,  $P < .01$ ). Rotation between prone and side positions in the bridge test suitably assessed muscular endurance of all major muscles involved in core stability. No significant differences in signal frequency across each stage, for all muscles ( $P > .05$ ), indicated that muscular fatigue was minimal. Based on the present study, the rope pull-up was deemed non-appropriate to assess operational climbing ability; while the rotational bridge served as a practical endurance assessment of all major muscles involved in core stability, with the 12 minute duration not likely to cause fatigue related injury.

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**LIST OF ABBREVIATIONS**

ACSM – American College of Sports Medicine	PCT – Physical competency test
ADL – Activities of daily living	PM – Pectoralis major
ANOVA – Analysis of variance	PCr – Phosphocreatine
AOS – Armed offenders squad	RA – Rectus abdominis
ARV – Average rectified variable	RMS – Root mean square
BB – Biceps brachii	STG – Special tactics group
Blue role – Open water operations	SWAT – Suburban weapons and tactics
BR – Brachioradialis	T ES – Thoracic erector spinae
BMI – Body mass index	U.S. – United States
EMG – Electromyography	VO <sub>2max</sub> – Maximal oxygen uptake
EO – External oblique	WP – Wide pronated
FI – Fatigue index	WS – Wide supinated
G. Maximus – Gluteus maximus	
G. Medius – Gluteus medius	
IO – Internal oblique	
IS – Infraspinatus	
LD – Latissimus dorsi	
L ES – Lumbar erector spinae	
LT – Lower trapezius	
MD – Mid-deltoid	
MT – Middle trapezius	
Mul – Multifidus	
MVIC – Maximal voluntary isometric contraction	
NZ – New Zealand	
O <sub>2</sub> - Oxygen	

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