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要旨

SMB (Snow mobile) 市場は、High Performance (高性能・軽量化) 領域への進化が著しい。しかし、雪上の遊びは High Performance を求める大人にだけ与えられたものではない。子供の頃から雪上の遊びとして、親と子、そして孫と一緒にトレールを走る、バックヤードで遊ぶなど、SMB でその楽しみを享受した子供・若者は、大人になってもその楽しさを忘れない。この環境・サイクルによって雪上における遊びの文化は継承され、ファミリースポーツとして遊ぶ楽しみこそが、この文化を支えている。

ヤマハ発動機は、2018 年にスノーモビル生産 50 周年を迎える。この節目の年に市場の要望に応えるべく、家族みんなで楽しめる Youth model 「スノースクート (Snoscoot)」を開発したのでここに紹介する。

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INTRODUCTION

In recent years, the snowmobile market has seen a remarkable shift towards the high performance (high output and light weight) category. However, it is not only adults who demand high performance fun in the snow. The enjoyment that snowmobiles bring to children and young people stays with them into adulthood, and riding together in backyards or on trails is established family fun in the snow for parents and children or grandchildren. In such an environment, the culture of snow leisure is inherited through this generational cycle, a culture which is built on enjoyment as a family sport. 2018 will mark the 50th anniversary of snowmobile production by Yamaha Motor. To mark this milestone while meeting market expectations, Yamaha Motor has developed the Snoscoot youth model. This report provides details of the new model's development.

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DEVELOPMENT AIMS

Five years ago, Yamaha Motor launched the kids' model (category for riders aged 8 and under) SRX120. The new Snoscoot has been developed for young people (aged 8 to 12) stepping up from kids' models towards full-sized adult models.

In order for the Snoscoot youth model to increase demand among young people and attract interest in snowmobiling among a new family market, the following three development targets were set in order to create a model which all of the family can enjoy together.

1. Comfort: Riding stability and sense of acceleration on hard, flat surfaces
2. Off-road performance: Maneuverability for operation as the rider intends in wooded areas, as well as boondocking (free off-trail riding in deep snow)
3. Accessory lineup: Developing a wide range of

accessories to suit the demands of the youth market for customization

3 DEVELOPMENT INITIATIVES

3-1. ENGINE

Engine development for the Snoscoot aimed to achieve both more efficient development and cost reductions by using an existing engine, but one which went beyond those previously used in Yamaha Motor snowmobiles.

The base engine selected was the YMPC (Yamaha Motor Powered Products Co., Ltd.) MZ200 multi-purpose 4-stroke engine (Fig.1), which, while already delivering high reliability and low cost, was further improved in the following four ways (Fig.2).

- Starting in low temperatures
- Operation during snow fall conditions
- Harmonizing with intake and exhaust systems
- Performance improvement through matching with the CVT transmission



Fig.1 MZ200



Fig.2 MZ200SMB improved for fitting to the Snoscoot

3-2. DRIVETRAIN

The all new drivetrain (Fig.3) for the Snoscoot was designed to transfer power efficiently and inspire confidence for the rider. The new Snoscoot pairs a Yamaha multi-purpose engine with a CVT drivetrain to

deliver power across a broad range of speeds. The drive train system was developed with a CVT and drop case combination to increase the performance of the vehicle. The CVT is tuned for hard-packed trails (Fig.4) while also functioning exceptionally well off-trail (Fig.5). The drop case was designed with a cogged belt for maximizing efficiency along with reducing maintenance and weight. The newly-designed drivetrain and testing calibration meet the demands of all riders and bring a high level of confidence both on and off trails.

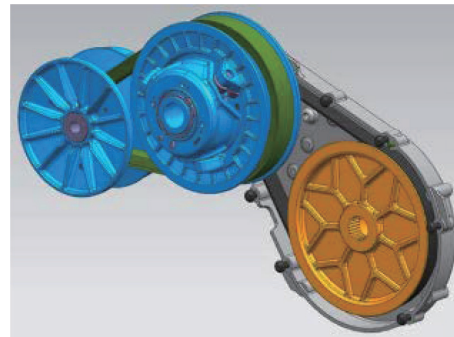


Fig.3 New drivetrain



Fig.4 On-trail scene



Fig.5 Off-trail scene

3-3. SKIS

The new small skis from Yamaha were created specifically for this smaller vehicle application, and for riding both on and off trails. These skis offer the best balance between light weight and light steering effort while still maintaining maximum floatation for off trail fun (Fig. 6, Table 1). The light steering effort allows the rider to enjoy the excitements of riding for longer without tiring. The keel and runner were designed to maximize rider inputs with little effort while minimizing negative feedback from the terrain. These skis were designed to be less intimidating for newer riders, allowing them to increase their riding skills quickly on and off the trail.

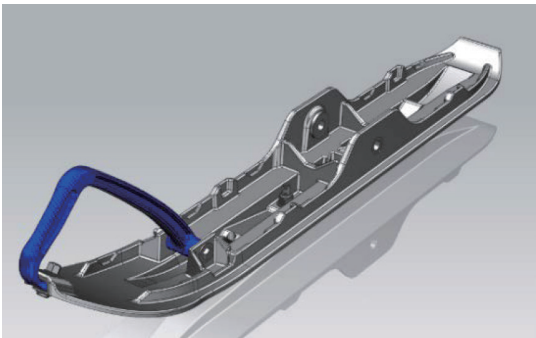


Fig.6 New ski

Table1: Design Spec

	SRX120	Target	Aftermarket	Snoscoot
Notes	Too small	← →	Too large	
Length	640mm	710mm	780mm	710mm
Width	100mm	110mm	120mm	110mm
Weight	1.0kg (2.2lb)	<1.0kg (<2.2lb)	2.15kg (4.75lb)	0.86kg (1.90lb)

3-4. EXTERIOR DESIGN

The body panels were designed to demand and capture attention while retaining light weight and a simple construction (Fig. 7). The styling gives the snowmobile an agile and aerodynamic look. However, the panels still function well, sheltering the rider from the environmental elements.

The overall shape draws the eyes over the entire length of the snowmobile, flowing from the front tuning fork to the seat.



Fig.7 Coloring & Graphics

3-5. ERGONOMICS (RIDING POSITION)

This snowmobile was a great challenge to comfortably fit many body sizes, from large adults (Fig. 8) to small-sized youth generation (Fig. 9) A small brand-new rider will sit comfortably on the seat with an easy reach to the handlebars and levers. At the same time an experienced full-sized rider has the room to sit fully back on the seat and enjoy the performance to the fullest. The narrowed and lowered front seat shape allows the rider to move around freely during off trail riding. Finally, the controls are all within easy reach. This snowmobile is designed for fun accessible to all.

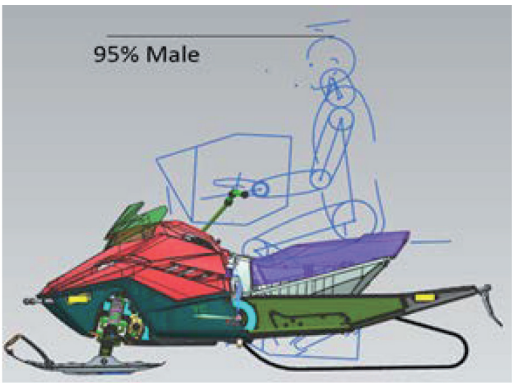


Fig.8 Design ergonomics



Fig.9 Riding position



Fig.10 2018 Snowmobile of the Year

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CONCLUSION

This report describes the development of the youth-oriented Snoscoot snowmobile, which all of the family can enjoy together. The development program achieved its goals of comfort and off-road performance while still achieving cost targets, which were endorsed by evaluations of test vehicles by target customers. The Snoscoot has also been chosen by a prominent media outlet as 2018 Snowmobile of the Year (Fig. 10), and has been well-received by the market.

It has been some time since youth models using 2-stroke engines have disappeared from the snowmobile market due to increasing emission standards. Yamaha Motor hopes that by returning to the essence of snowmobiling - family sports fun - the new Snoscoot will reinvigorate the market.

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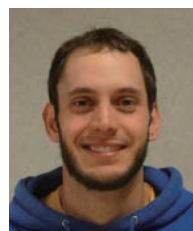
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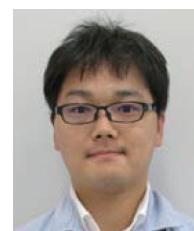


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