Description of Model for Estimation of Breeding Values for Calving Traits

Trait definition
Calving ease

1	normal birth	help of max. 2 people; no complications; no or light bruise of vagina
2	heavy birth	help of 3 or more people; bruise of vagina or neck of womb
3	heavy birth with veterinary aid	complications; veterinary aid is needed
9	no information	

Note: Stillbirth is not necessarily heavy birth.

Data included into evaluation
- Data since 1. 1. 2003 are used.
- Only first six calvings.
- Age at first calving must be in interval <640; 1150> days.
- Stillbirths are included only if gestation length is <260; 299> days.
- Multiple calvings are excluded (twins or more).
- Embryotranfers are excluded.
- Whole herd is excluded if there are 97% or more same classifications of calving ease per year.

Evaluation is executed individually for breed HOL and SIM.

Holstein population
- Cows must have at least 75 % of HOL blood and their sire must be registered in HOL herdbook.
- Sire of calf must have at least 75 % of HOL blood.

Simmental population
- Cows must have at least 51 % of SIM blood (max. 12,5 % of HOL blood and max. 49 % of RED blood) and their sire must be registered in SIM herdbook.
- Sire of calf must have at least 51 % of SIM blood.

Model
MT- BLUP-AM with maternal effect
(Multiple Trait - BLUP - Animal Model)

Two traits
- first calvings
- the other calvings

Random effects:
- cow
- calf
- herd - year - season (Dec-Feb, Mar-May, Jun-Aug, Sep-Nov)

(Note: In case there are less than 30 births per season, seasons are merged up to 4 seasons. If there are less than 20 births per merged 4 seasons, data are excluded).

Fixed effects:

- sex of calf – parity
- age of cow at calving - parity

Results

For each bull there are 4 breeding values calculated, 2 for maternal effect (M1 and M2) and 2 for direct effect (P1 and P2). Mentioned 2 values are always effects at first calving (M1 and P1) and effects at higher calving (M2 and P2). From these values index is computed (each value is included only if there are at least 10 births):

$$PV = 0,6 * P1 + 0,4 * P2$$

$$MV = 0,6 * M1 + 0,4 * M2$$

Relative breeding values (RBV) are then calculated:

$$RBV = [(BV - x) / s * 12] + 100,$$

x average BV for birth year 2005
s standard deviation for birth year 2005

Publication

Relative breeding values for P1, PV and MV are published for bulls born since 1992.